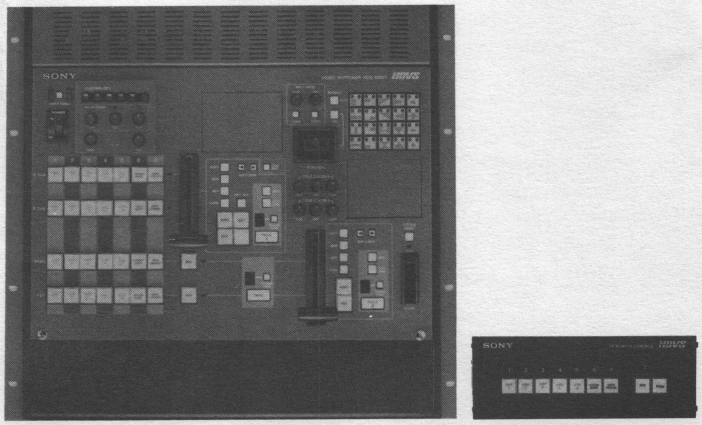
SONY

HD VIDEO SWITCHER

HDS-1000
HDS-1000T



HDVS

OPERATION AND MAINTENANCE MANUAL

1st Edition (Revised 4)

HDS-1000

Serial No. 10106 and Higher

HDS-1000T

Serial No. 10001 and Higher

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Components identified by shading and ⚠ marked on the schematic diagrams and parts list are critical to safe operation. Replace these components with SONY parts whose part numbers appear as shown in this manual or in supplements published by SONY.

For the customers in the USA

WARNING
This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

You are cautioned that any changes or modifications not expressly approved in this manual could void your authority to operate this equipment.

The shielded interface cable recommended in this manual must be used with this equipment in order to comply with the limits for a digital device pursuant to Subpart B of Part 15 of FCC Rules.

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SECTION 1 OPERATION

The HDS-1000T is a compact and high-performance portable video switcher with versatile functions, which is designed as a component of the High Definition Video System (HDVS). Using the switcher with HDVS cameras and VTRs, high definition video programs full of variety can be easily produced.

1-1. GENERAL

Various types of inputs and outputs
The unit can accept two title inputs, one gen-lock input as well as seven video inputs. For outputs, it provides two for program, one for preview, one for return video, and one controllable from the supplied remote control unit for an operator. In addition, a sync signal output for a black & white camera, two sync signal outputs and a tally output for video inputs 1 through 7 plus title inputs 1 and 2 provide a wider variety of system configurations.

Four channel bus lines
A, B bus lines and program, preset bus lines are provided. Special effects, such as mixing and wiping, are possible between A bus and B bus or between the program bus and the preset bus. While mixing A bus and B bus, the preset bus can be additionally mixed in. The "double wipe" function permits selection of a different wipe pattern for each of a wipe between A bus and B bus and a wipe between the program bus and the preset bus.

31 wipe patterns
In addition to 20 basic wipe patterns, 11 "rotary wipe" patterns are available. Special effects as "soft", "border" and "modulation" options can be added to the selected wipe patterns. With some particular wipe patterns, the center position of the wipe can be shifted as desired.

Built-in chroma key function
The built-in chroma key circuit allows an easy chroma key operation with any desired color.

Title-in (superimpose) function
Two title input connectors independently apply titles to A bus/B bus and the program bus/preset bus. The titles can be bordered or be superimposed only by the outline of the characters. The built-in two color generators permit selection of different colors for these two titles.

Color bar and background color generator
The built-in color bar and background color generators provide color bar and background colors with the touch of a single button.

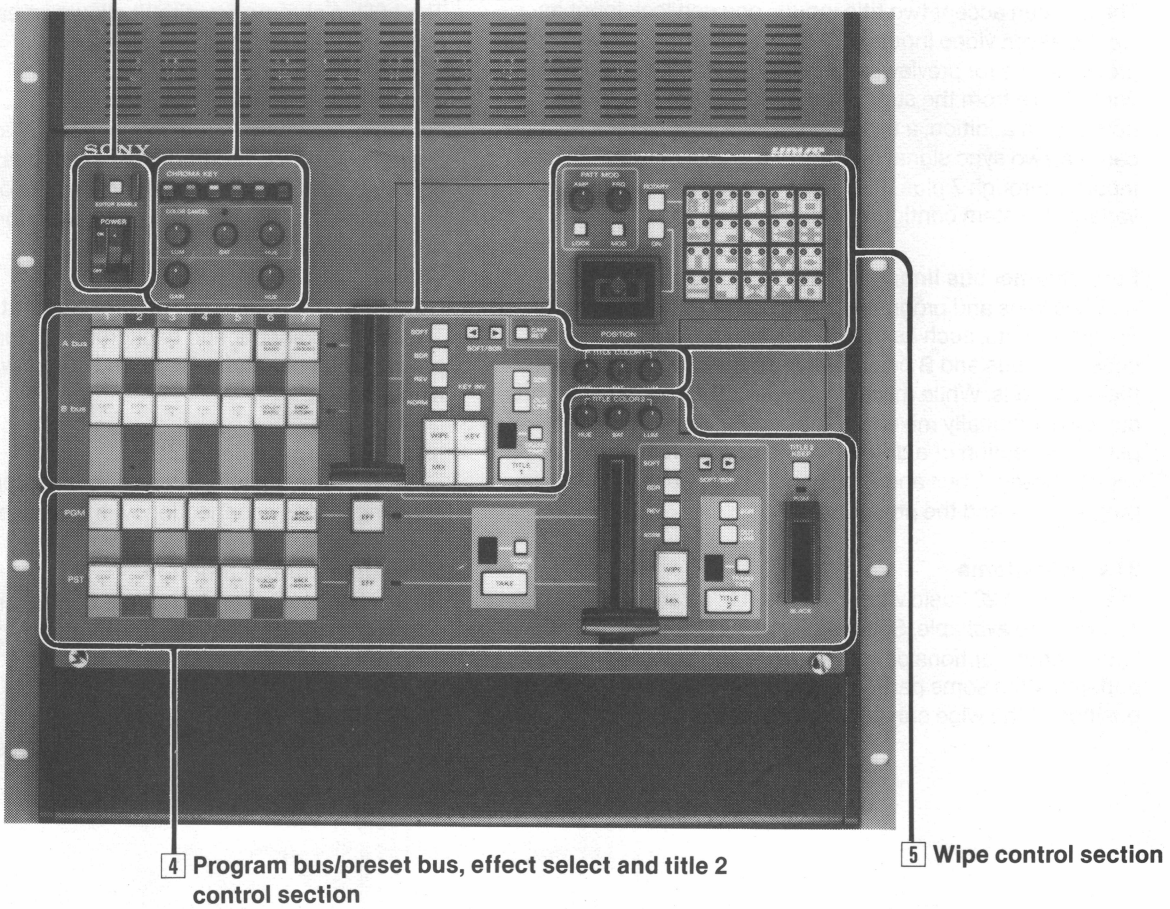
Interface with a video editor
Both parallel and serial interface connectors are provided, enabling an easy connection with a Sony editing control unit.

VE remote control function
An auxiliary output and a remote control unit permit an operator to monitor any desired signals regardless of the program output.

Mounting in a 19-inch standard rack
This unit can be mounted in a 19-inch EIA standard rack.

1-2. LOCATION AND FUNCTION OF PARTS AND CONTROLS

1-2-1. Control Panel

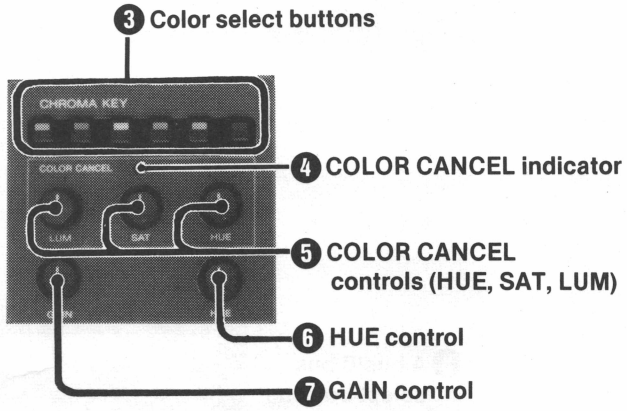


1 Power and editor enable section

1 POWER switch
Turns the power on when the upper ON side is depressed. To turn off, press the OFF side.

2 EDITOR ENABLE button
When the button is depressed, the button lights up and the unit can be controlled from an editing control unit connected to the REMOTE connector (Editor Enable mode). Press the button again and turn off the button illumination to release the unit from the Editor Enable mode.

2 Chroma key control section



3 Color select buttons
Select a color for the chroma key. Press the button with the color corresponding to the background color of the chroma key.

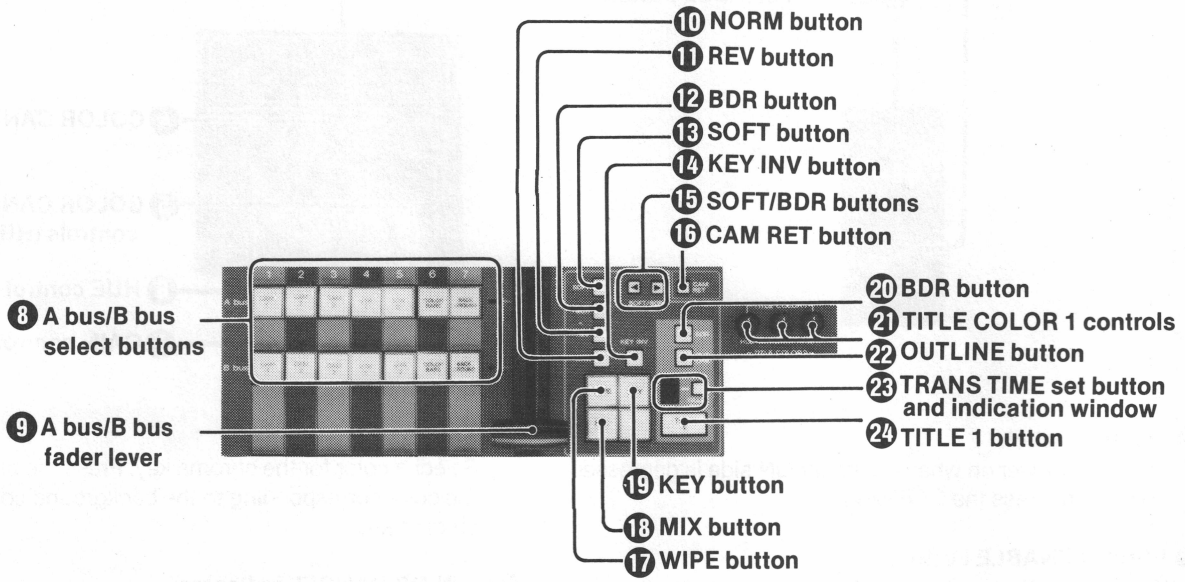
4 COLOR CANCEL indicator
Lights to show that the unit is in the color cancel mode when the KEY button of the A bus/B bus control section is independently depressed.

5 COLOR CANCEL controls (HUE, SAT, LUM)
While the COLOR CANCEL indicator lights, adjust the LUM (luminance), SAT (saturation) and HUE controls so that the background color of the chroma key becomes an achromatic color.

6 HUE control
Adjusts the hue of the picture keyed by chroma key.

7 GAIN control
Adjusts the keying level.

3 A bus/B bus control, effect select and title 1 control section



⑧ A bus/B bus select buttons

Select input signal to A bus and B bus, respectively. The buttons 1 through 5 correspond to the VIDEO IN 1 through 5 connectors on the rear connector panel.

When the button 6 is pressed, the color bar generated by the built-in generator is selected. When the button 7 is pressed, the background color is selected. The color of the background is adjusted with the TITLE COLOR 1 controls. The function of the buttons 6 and 7 can be internally modified so that signals to the VIDEO IN 6 and 7 connectors are selected with the buttons. For the modification, refer to Section 2 or later. In chroma key operation, select a signal for the chroma key from A bus line.

⑨ A bus/B bus fader lever

Switches the A bus picture and B bus picture.

The picture of the bus on the lever side is obtained and the indicator of the selected bus line lights. When the power is applied, slide the lever to either end position once.

⑩ NORM (normal) button

Selects the direction of wiping between A bus and B bus. Each fader lever stroke wipes the pictures in a particular direction (e.g. from left to right).

When the button is depressed together with the REV button, the direction of wiping changes at each lever stroke (e.g. from right to left at the first stroke and from left to right at the second stroke, and so on).

⑪ REV (reverse) button

Selects the direction of wiping between A bus and B bus. Each fader lever stroke wipes the pictures in a particular direction (e.g. from right to left).

When the button is depressed together with the NORM button, the direction of wiping changes at each lever stroke (e.g. from left to right at the first stroke and from right to left at the second stroke, and so on).

Examples of wiping directions when the NORM and/or REV buttons are pressed

button \ lever	A / B ↑	A / B ↓
NORM	A → B	B → A
REV	B ← A	A ← B
NORM + REV	A → B	A ← B

⑫ **BDR (border) button**
Borders a wipe pattern. The width of the border can be adjusted with the SOFT/BDR buttons.

⑬ **SOFT button**
Softens the edge of a wipe pattern for wiping between A bus and B bus. The width of the softened edge can be adjusted with the SOFT/BDR buttons.

⑭ **KEY INV (key invert) button**
Inverts the portions to be keyed-in in a chroma key operation. The first push on the button illuminates the button and the second push turns it off.
Normally, keep the button off. While the button is lit, the portion where the B bus picture is keyed-in is reversed.

⑮ **SOFT/BDR (soft/border) buttons**
Adjust the width of the softened edge or the border of a wipe pattern.

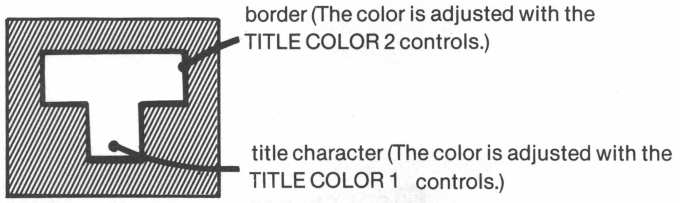
⑯ **CAM RET (camera return) button**
When this button is depressed, effects at A bus/B bus are output from the RETURN VIDEO OUT connector regardless of the selection at the PGM bus line. This is especially efficient when adjusting the frame of the picture in a chroma key operation.

⑰ **WIPE button**
The images of A bus and B bus are wiped with a wipe pattern selected at the wipe control section.

⑱ **MIX button**
The images of A bus and B bus are switched by mixing. When the power is turned on, the MIX mode is automatically selected.

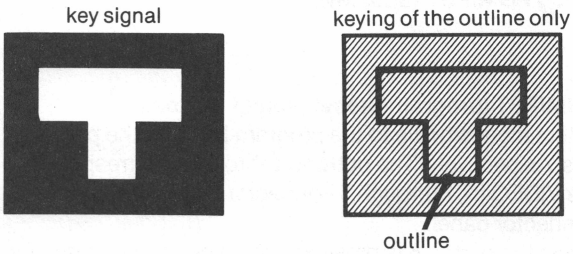
⑲ **KEY button**
When the KEY button is independently depressed in chroma key operation, the unit enters the "color cancel" mode and the COLOR CANCEL indicator lights up. When the KEY button is pressed together with the MIX button, the unit enters "key mixing" mode, and the chroma key picture is switched to the B bus picture in mixing when the fader lever is moved to the opposite side. When the KEY button is pressed with the WIPE button, the unit enters the "key wiping" mode, and the chroma key picture is switched to the B bus picture in wiping when the fader lever is moved to the opposite side.

⑳ **BDR (border) button**
For superimposing a title with a border. Press this button so that the button lights up.



㉑ **TITLE COLOR 1 controls**
Adjust the color of the title from a camera connected to the TITLE IN 1 connector on the rear connector panel. The background color is adjusted at the same time with the color phase reversed.
LUM (luminance) control: Adjusts the luminance of the color.
SAT (saturation) control: Adjusts the saturation of the color.
HUE control: Adjusts the hue of the color.

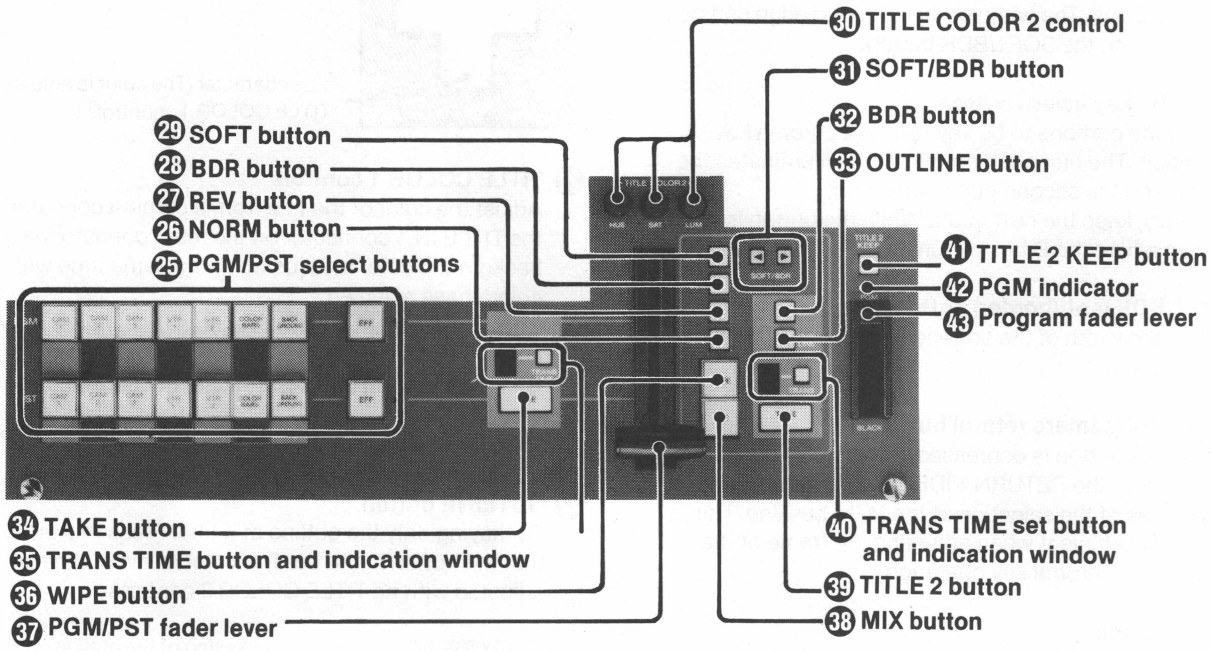
㉒ **OUTLINE button**
For keying only the outline of a title. Press this button so that the button lights up. The color of the outline is adjusted with he TITLE COLOR 2 controls.



㉓ **TRANS TIME (transition time) set button and indication window**
Sets the time to fade in and out a title when the TITLE 1 button is pressed. Each push on this button increases the time by 20 frames. The set value is indicated in the TRANS TIME indication window on the left. The maximum setting value is 180 frames.

㉔ **TITLE 1 button**
Used for superimposing a title from a telop camera connected to the rear TITLE IN 1 connector into the picture selected with the A bus/B bus select buttons. Press this button to superimpose the title. To erase the title, press the button again.
When the button is briefly (within 0.5 second) pressed, the title is cut in or cut out. When the button is pressed for a longer time, the title is faded in or faded out according to the time set with the TRANS TIME set button.
The color of the title is adjusted with the TITLE COLOR 1 controls.

4 Program/preset control, effect select and title 2 control section



25 PGM/PST (program/preset) select buttons
Select input signals to the program bus and the preset bus, respectively. The buttons 1 through 5 corresponds to the VIDEO IN 1 through 5 connectors on the rear connector panel.
When the button 6 is pressed, the color bar generated by the built-in generator is selected. When the button 7 is pressed, the background color is selected. The color of the background is adjusted with the TITLE COLOR 1 controls. The function of buttons 6 and 7 can be internally modified so that signals to the VIDEO IN 6 and 7 connectors are selected with the buttons. For the modification, refer to Section 2 or later.

26 NORM (normal) button
Selects the direction of wiping between the program bus and the preset bus. Each fader lever stroke wipes the pictures in a particular direction (e.g. from left to right). When the button is depressed together with the REV button, the direction of wiping changes at each lever stroke (e.g. from right to left at the first stroke and from left to right at the second stroke, and so on).

27 REV (reverse) button
Selects the direction of wiping between the program bus and the preset bus. Each fader lever stroke wipes the pictures in a particular direction (e.g. from right to left). When the button is depressed together with the NORM button, the direction of wiping changes at each lever stroke (e.g. from left to right at the first stroke and from right to left at the second stroke, and so on).

28 BDR (border) button
Borders a wipe pattern used for wiping between the program bus and preset bus. The width of the border can be adjusted with the SOFT/BDR button.

29 SOFT button
Softens the edge of a wipe pattern in wiping between the program bus and the preset bus. The width of the softened edge can be adjusted with the SOFT/BDR buttons.

30 TITLE COLOR 2 control
Adjust the color of the title from a camera connected to the TITLE IN 2 connector on the rear panel.
The color of the border of title 1 characters is adjusted at the same time with the color phase reversed.
LUM (luminance) control: Adjusts the luminance of the color.
SAT (saturation) control: Adjusts the saturation of the color.
HUE control: Adjusts the hue of the color.

㉛ SOFT/BDR (soft/border) buttons
Adjust the width of the softened edge or the border of a wipe pattern.

㉜ BDR (border) button
For superimposing a title with a border. Press this button so that the button lights up. The border will be colored only black.

㉝ OUTLINE button
For keying only the outline of a title. Press this button so that the button lights up. The color of the outline is adjusted with the TITLE COLOR 2 control.

㉞ TAKE button
Switches the program bus picture and the preset bus picture. The indicator of the selected bus line lights up. When the button is briefly (within 0.5 second) pressed, the pictures are switched by cut. When the button is pressed for a while, the pictures are switched by fade in a time set with the TRANS TIME set button.

㉟ TRANS TIME (transition time) button and indication window
Sets the time to switch the pictures by pressing the TAKE button. Each push on this button increases the time by 20 frames. The set value is indicated in the TRANS TIME indication window on the left. The maximum setting value is 180 frames.

㊱ WIPE button
The images of the program bus and the preset bus are wiped with a wipe pattern selected at the wipe control section.

㊲ PGM/PST (program/preset) fader lever
Swithces the program bus picture and the preset bus picture.
When the power is applied, once slide the lever to either end position.

㊳ MIX button
The images of the program bus and the preset bus are switched in mixing. When the power is turned on, the MIX mode is automatically selected.

㊴ TITLE 2 button
Used for superimposing a title from a telop camera connected to the rear TITLE IN 2 connector into a picture selected with the PGM bus/PST bus select button. Press this button to superimpose the title. To erase the title, press the button again.
When the button is briefly (within 0.5 second) pressed, the title is cut in or cut out. When the button is pressed for a longer time, the title is faded in or faded out according to the time set with the TRANS TIME set button.
The color of the title is adjusted with the TITLE COLOR 2 controls.

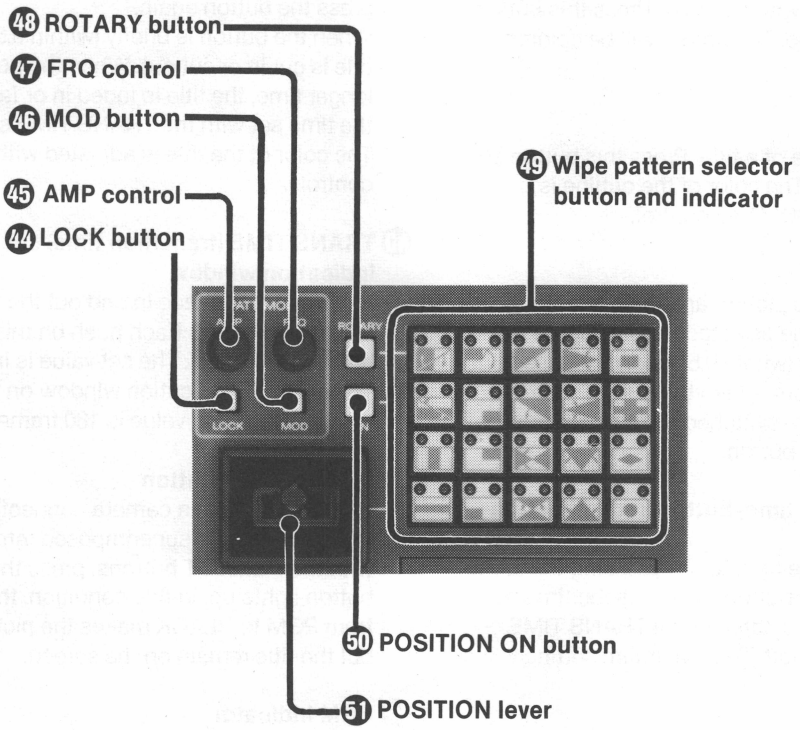
㊵ TRANS TIME (transition time) set button and indication window
Sets the time to fade in and out the title when the TITLE 2 button is pressed. Each push on this button increases the time by 20 frames. The set value is indicated in the TRANS TIME indication window on the left. The maximum setting value is 180 frames.

㊶ TITLE 2 KEEP button
While a title from a camera connected to the rear TITLE IN 2 connector is superimposed into a picture selected with the PGM/PST buttons, press this button so that the button lights up. In this condition, the fader lever stroke from PGM to BLACK makes the picture fade into black but the title remain on the screen.

㊷ PGM indicator
Lights when the program fader lever is not at the PGM position.

㊸ Program fader lever
Normally, set this lever to the PGM side so that the PGM indicator is off. When the lever is moved to the BLACK side, the program picture is faded out into black.

5 Wipe control section



44 LOCK button
To lock the wave in modulation, press this button (the button lights up). To release this mode, press the button again (the button goes off).

45 AMP (amplitude) control
Adjusts the amplitude of the wipe modulation while the MOD button is lit.

46 MOD (modulation) button
To modulate the wipe pattern, press this button (the button lights up). To release the modulation, press the button again (the button goes off).

47 FRQ (frequency) control
Adjusts the wipe modulation frequency while the MOD button is lit.

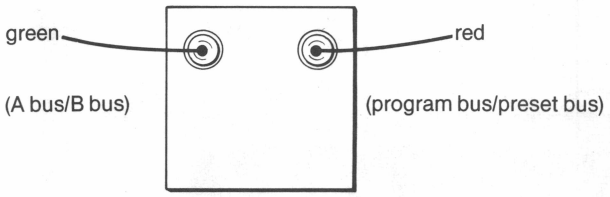
48 ROTARY button
Press this button (the button lights up) to activate the rotary capability of the selected wipe pattern. To release this mode, press the button again (the button goes off). The wipe pattern select buttons for the eleven rotary wipe patterns have an arrow or two to indicate the direction of the rotation. The "rotary" function is only effective on wiping between A bus and B bus.

㊾ Wipe pattern selector buttons and indicators

Select a wipe pattern to be used. The wipe pattern can be selected independently at the A bus/B bus lines and the program bus/preset bus lines.

To select a wipe pattern for A bus/B bus, press the WIPE button of the A bus/B bus control section and then the desired wipe pattern select button. The depressed button and the green indicator at the upper left corner of the button will light up.

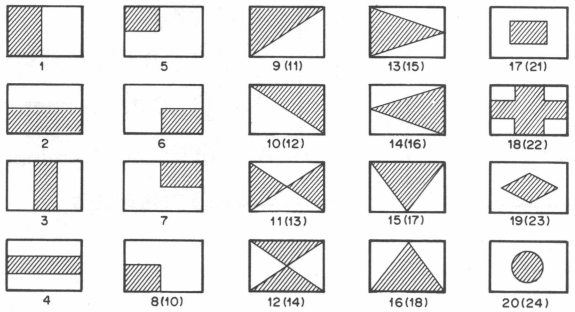
To select a wipe pattern for the program bus/preset bus, press the WIPE button of the program bus/preset bus control section, and then the desired wipe pattern select button. The depressed button and the red indicator at the upper right corner of the button will light up.



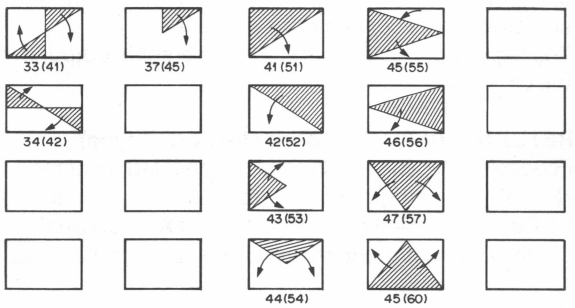
Wipe pattern table

The numbers under patterns refer to the wipe pattern numbers. Use these numbers to select the wipe on an editing control unit.*

Standard wipe patterns



Patterns with rotary capability



* When connecting the BVE-5000 editing control unit through the parallel interface, use the numbers in parentheses.

㊿ POSITION ON button

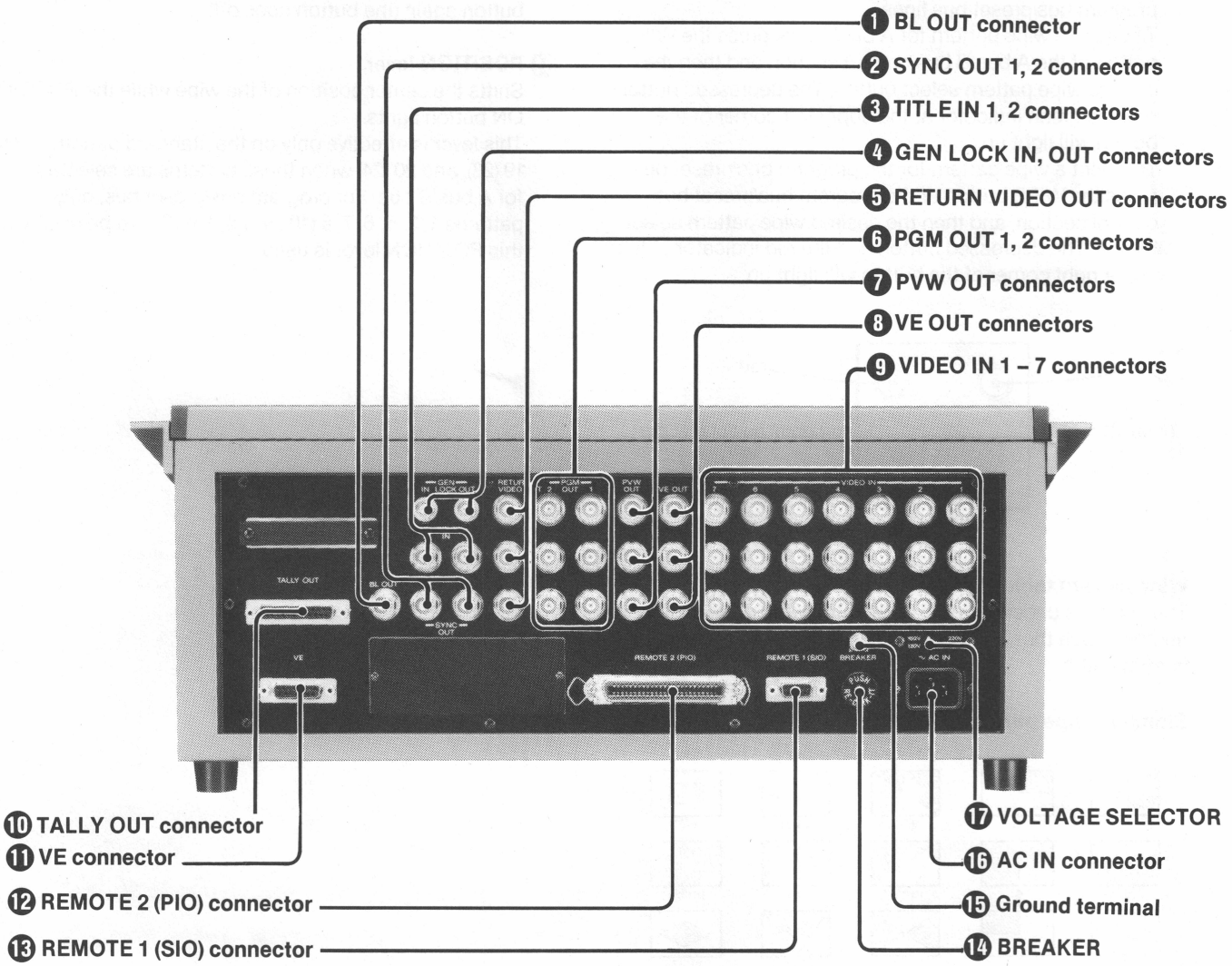
To shift the center position of the wipe, press this button (the button lights up). To release this mode, press the button again (the button goes off).

㊿① POSITION lever

Shifts the center position of the wipe while the POSITION ON button lights.

This lever is effective only on the standard patterns 17 (21), 19 (23), and 20 (24) when these patterns are selected for A bus/B bus. For program bus/preset bus, only patterns 1, 2, 5, 6, 7, 8 (10), 9 (11), 10 (12) can be used while this POSITION lever is used.

1-2-2. Connector Panel



1 BL OUT (blanking output) connector (BNC type)
Outputs a blanking signal for black & white signals. Connect to the BLK IN connector of the HDST-1000T HD telop camera.

2 SYNC OUT 1, 2 connectors (BNC type)
Output sync signal for gen-lock. Connect to the sync input connectors or the gen-lock input connectors of a HDVS VTR or camera.

3 TITLE IN 1, 2 connectors (BNC type)
Accept signals for title 1 (for A bus/B bus) and title 2 (for program bus/preset bus). Connect to the output connectors of the HDST-1000T.

4 GEN LOCK IN, OUT connectors (BNC type)
To operate the unit with an external sync signal, connect the reference signal (a sync signal or a composite video signal) to the IN connector.
The signal connected to the IN connector is output from the OUT connector.

5 RETURN VIDEO OUT connectors (BNC type)
Feed return video signals to the connected cameras. Normally, the program output is obtained. When the CAM RET button is depressed, the effect of A bus/B bus line is output. Connect to the return video inputs of cameras.

⑥ PGM OUT (program output) 1, 2 connectors (BNC type)
Feed the final program output. Connect to the video input connectors of a VTR for recording or a program monitor. The connectors 1 and 2 output the same signal.

⑦ PVW OUT (preview output) connectors (BNC type)
Feed the signal selected on the preset bus line. Connect to the video input connectors of a preview monitor.

⑧ VE OUT (video engineer output) connectors (BNC type)
Feed signals for VE monitoring. Connect to the video input connectors of a monitor.
The output signal at these connectors can be controlled on the supplied remote control connected to the VE connector regardless of the program signal selection.

⑨ VIDEO IN 1 – 7 connectors (BNC type)
Accept video signals from video cameras, CCUs or VTRs whose signal is passed through a TBC. Each connector corresponds to one of the A bus/B bus or the program bus/preset bus select buttons 1 through 7 on the front panel.
At the factory, the buttons 6 are reserved for color bar signal and the buttons 7 are reserved for the background colors. To use the signals connected to the connectors 6 and 7, internal connection must be changed. In this case, the color bar and the background color cannot be used. For details, refer to Section 2 or later.

⑩ TALLY OUT connector (25-pin D-sub multi-connector)
Outputs tally signals to equipment connected to the VIDEO IN 1 through 7 and the TITLE IN 1, 2 connectors. This connector is of make-contact type, and the contact capacity is maximum 0.5 A. Connect to the tally input of the equipment by using a 25-pin plug.

Pin assignment

Pin No.	Signal
1, 2	VIDEO IN 1
3, 4	VIDEO IN 2
5, 6	VIDEO IN 3
7, 8	VIDEO IN 4
9, 10	VIDEO IN 5
11, 12	VIDEO IN 6
13, 14	VIDEO IN 7
15, 16	TITLE 1
17, 18	TITLE 2
19 through 25	spare

⑪ VE (VE remote control) connector (15-pin multi)
Connects the supplied VE remote control unit.

⑫ REMOTE 2 (PIO) (remote 2 parallel interface) connector (50-pin)
Connects equipment, such as an editing control unit having a parallel interface.

⑬ REMOTE 1 (SIO) (remote 1 serial interface) connector (9-pin)
Connects equipment, such as an editing control unit having a serial interface.

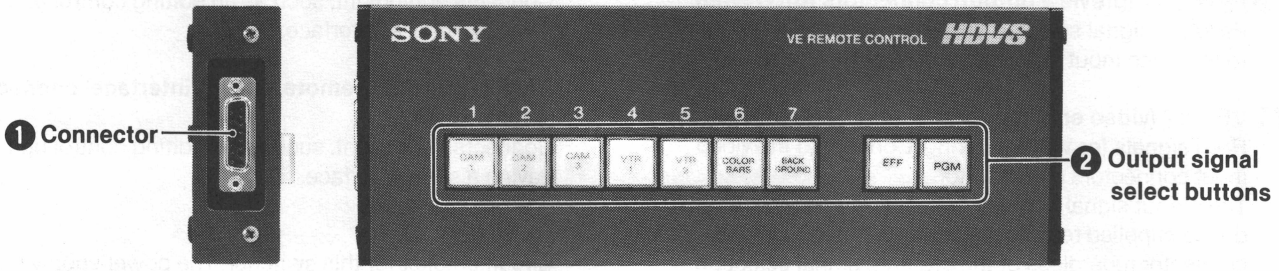
⑭ BREAKER
Circuit breaker for this switcher. The power supply is cut off when overcurrent occurs in the internal circuitry. Turn the power supply back on only after inspecting and adjusting the circuitry and pushing in the breaker.

⑮ Ground terminal
Used if a ground connection is required.

⑯ AC IN connector
Connect to an AC power source using the supplied AC power cord.

⑰ VOLTAGE SELECTOR
Sets the operating voltage of this unit to the local power line voltage.

1-2-3. VE Remote Control



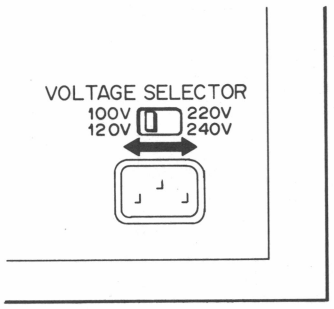
1 Connector
Connect to the VE connector of the main unit by using the supplied remote control cable.

2 Output signal select buttons (1 – 7, EFF, PGM)
Select a signal to be output from the VE OUT connectors on the main unit.
1 – 7: A signal of VE bus line corresponding to the depressed button is obtained.
EFF: The result of the effect at A bus /B bus is obtained.
PGM: The program picture is obtained.

1-3. CONNECTIONS AND PREPARATIONS

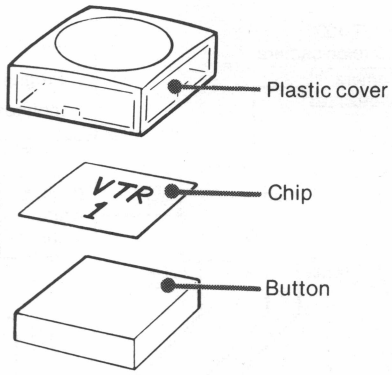
1-3-1. Voltage Adaptation

This unit operates on either 100 – 120 or 220 – 240 V AC. Before the initial use, make sure that the VOLTAGE SELECTOR at the rear of the unit is set to the local power line voltage. If not, reset the switch.



1-3-2. Attaching the Switch Chips on the buttons

On the buttons to select a picture, chips indicating the video signal sources (supplied) can be attached as follows.

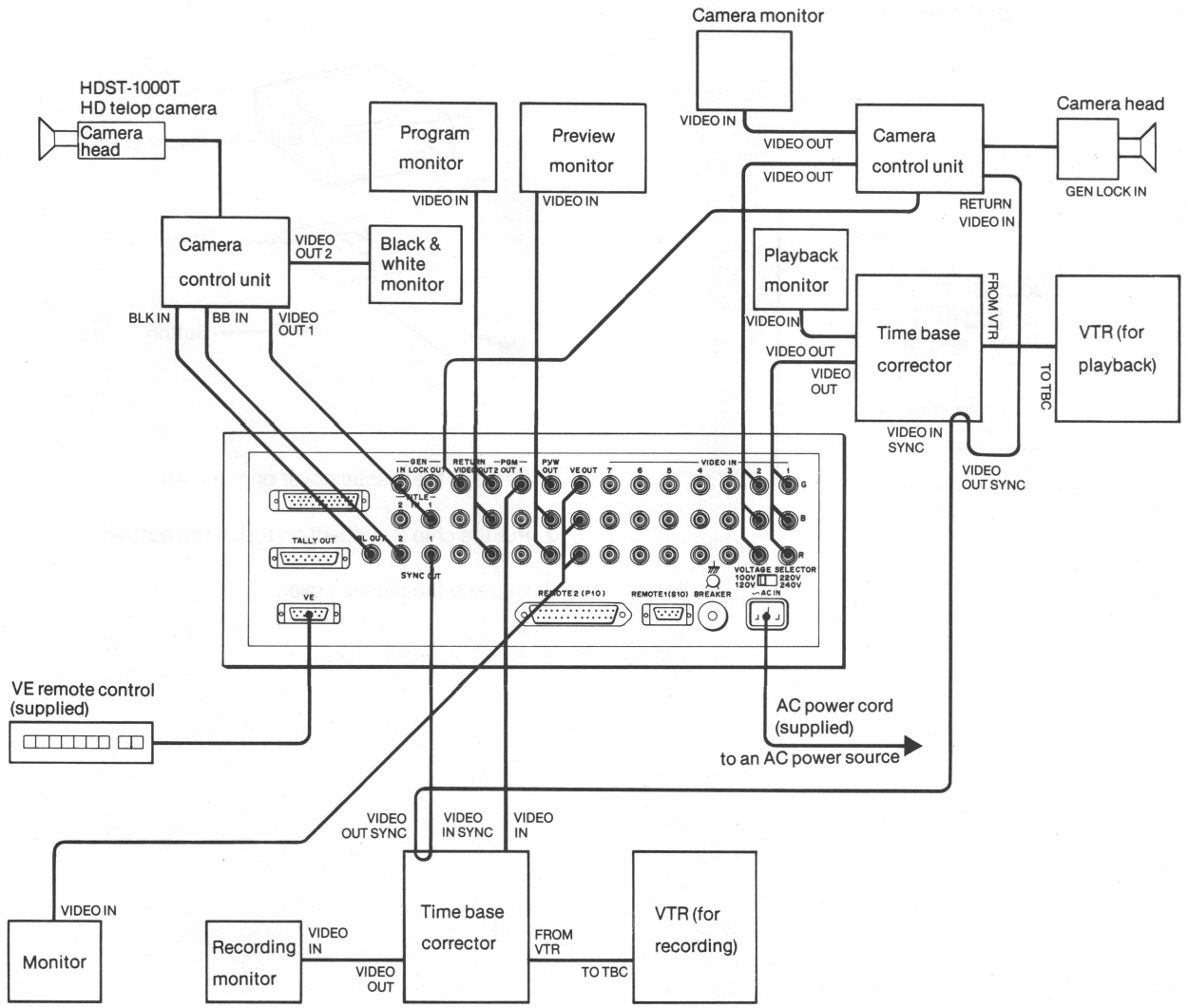


1 Remove the plastic cover on the button.

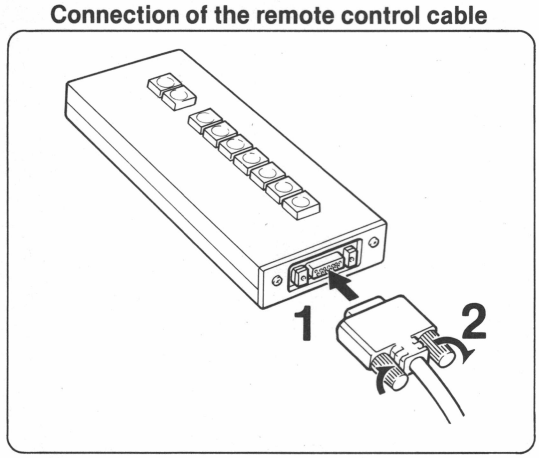
2 Put the chip (supplied) on top of the button.

3 Replace the plastic cover.

1-3-3. Basic Connections



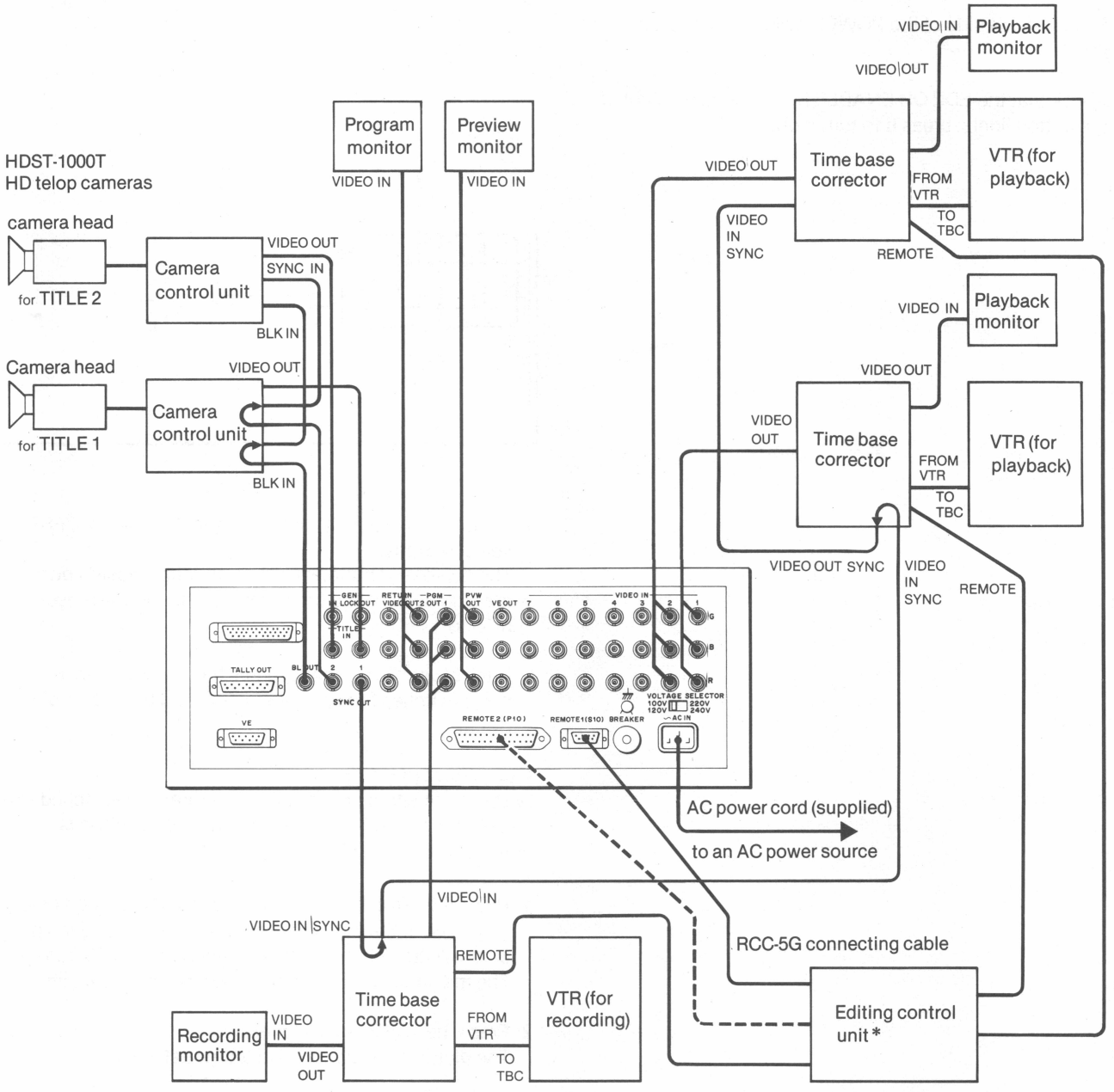
Connection of the remote control cable



Notes

- The unit is equipped with two sync output connectors for synchronization. Should more than two outputs be required, use a sync distributing amplifier.
- This unit is designed for use in the 1125/60 high definition video system (HDVS) employing the new tri-level bipolar synchronizing signal system. Therefore, use peripheral equipment employing the same synchronizing signal system.
  However, if a Sony HDSC-1000 HD sync converter is used to convert the conventional signal format to the new one used by this unit and vice versa, then the conventional equipment (HDC-100 and its peripheral equipment) can be used with this unit.

1-3-4. Connection Example for Editing



To make a connection cable, use shielded multi-cables and EMI treated shells only.

Recommended multi-cables

Should conform with the UL STYLE 2464 AWG 28.
e.g. HITACHI CABLE Ltd. CO-MA-VV (shielded) series

Recommended shells

JAE DD-C4-J13 or DD-C8-J13-F1-1

Recommended connector

JAE DD-50PF-N

* In case that the editing control unit is BVE-5000, use either of the REMOTE 1 or the REMOTE 2 connector for the connection. In case of the BVE-900, use the REMOTE 1 connector.

1-4-1. Set-up

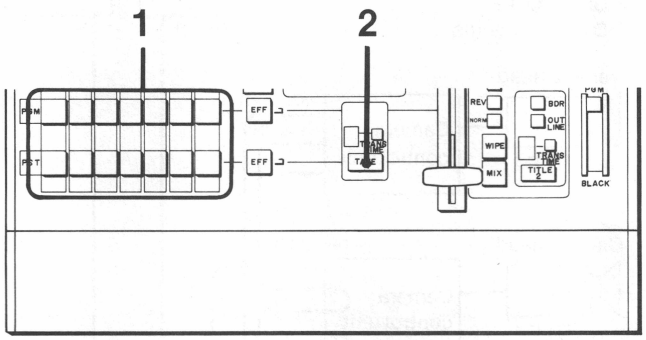
1 Check that equipment to be used is correctly connected.

2 Press the ON side of the POWER switch to turn on the power.

3 Check that the EDITOR ENABLE button does not light. If the button lights, press it to turn it off.

1-4-2. Cut-in/cut-out

The picture of the program bus and that of the preset bus can be switched by cut.



1 Select input signals by pressing the desired PGM/PST bus select buttons.
The depressed buttons light up and the selected pictures are displayed on the program monitor and the preset monitor.

2 Briefly (within 0.5 second) press the TAKE button. Each push switches the program picture and the preset picture by cut.

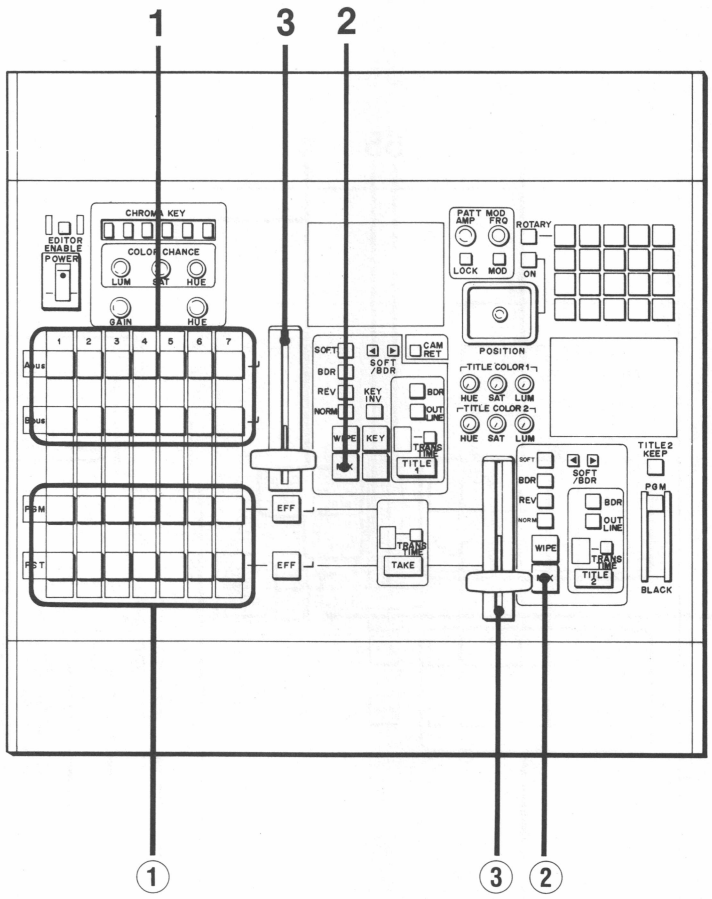
Transition operation
With the transition operation, the pictures are switched in a preset time (transition time) when the TAKE button is pressed.

1 Press the TRANS TIME button so that the desired time is displayed in the indication window on the left. Each push on the button changes the transition time by 20 frames. The maximum setting value is 180 frames (6 seconds).

2 Press the TAKE button for a while.
The pictures are switched in a time set in step 1.

1-4-3. Mixing

The pictures can be switched between A bus and B bus or between the program bus and the preset bus by mixing (dissolve).



1 Select pictures to be mixed with the A bus/B bus select buttons or the PGM/PST select buttons. The depressed buttons will light up.

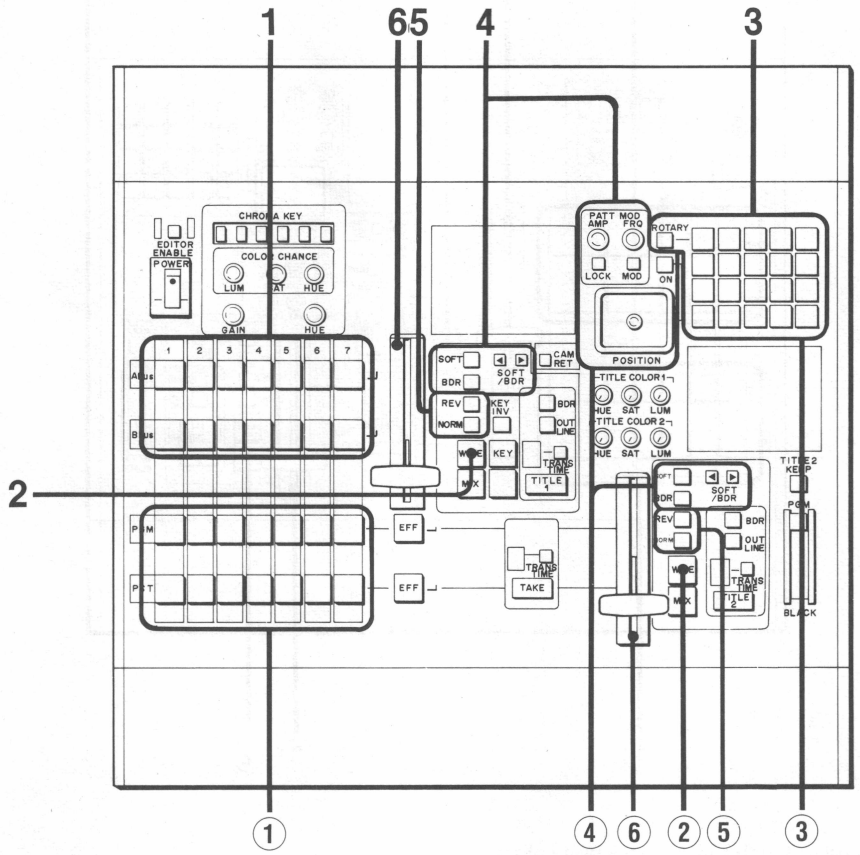
2 Press the MIX button of the selected bus control section. The MIX button will light up.

3 Slide the A bus/B bus fader lever or the PGM/PST fader lever from one side to the other. The pictures are mixed and then switched according to the movement of the lever. When mixing the A bus picture and the B bus picture, the bus indicator of the lever side will light up. When mixing the program bus picture and the preset bus picture, the indicator of the bus which is selected as the program output will light up.

1-4-4. Wipe

The pictures can be switched between A bus and B bus or between the program bus and the preset bus by wipe. 20 standard wipe patterns and 11 rotary wipe patterns are provided to be selected independently for A bus/B bus and for the program/ preset bus.

Operation



1 Press the A bus/B bus select buttons or the PGM/PST select buttons to select the pictures for wiping. The depressed buttons will light up.

2 Press the WIPE button of the A bus/B bus or PGM/PST control section. The WIPE button will light.

3 Press the desired wipe pattern select button to select the wipe pattern to be used.
When the WIPE button of the A bus/B bus control section is pressed in step 2, the green indicator on the upper left corner will light up. When the WIPE button of the PGM/PST control section is pressed in step 2, the red indicator at the upper right corner will light up.

- It is possible to use the same pattern for both the A bus/B bus and the PGM/PST bus. In this case, both the green and red indicators light.
- When using a rotary wipe, press the ROTARY button and then the wipe pattern select button, which has an arrow showing the direction of the wipe. (The rotary wipe is effective only for wiping on A bus/B bus.)

4 When adding a special effect (soft, border or modulation, or when shifting the center of the wipe (positioner), select the desired effect.
For details, refer to the respective discription below.

5 Select the direction of the wipe with the REV button and/or the NORM button.

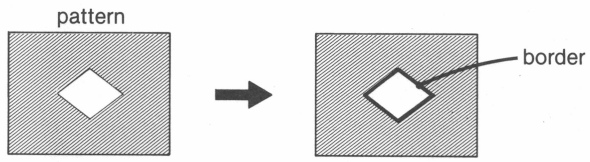
6 Slide the A bus/B bus fader lever or the PGM/PST fader lever from one side to the other. The pictures are wiped and then switched according to the movement of the lever. When wiping the A bus picture and the B bus picture, the bus indicator of the lever side will light up. When wiping the program bus picture and the preset bus picture, the indicator of the bus selected as the program output will light up.

Soft
The edge of the wipe pattern can be shaded off.

1 Press the SOFT button so that the button lights up.

2 Press the SOFT/BDR buttons to adjust the width of the softened area.

Border
A border can be added to the edge of the wipe pattern.

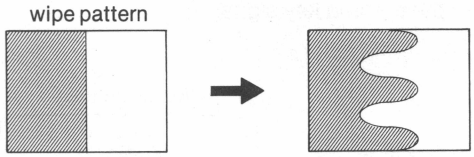


1 Press the BDR button so that the button lights up.

2 Press the SOFT/BDR buttons to adjust the width of the border.

3 For wiping between A bus and B bus, adjust the color of the border with the TITLE COLOR 1 controls. For wiping between the program bus and the preset bus, the color of the border is fixed to black and the color adjustment is not possible.

Modulation
The vertical edge of a wipe pattern can be modulated in a wave form.



1 Press the MOD button so that the button lights up. The edge of the wipe pattern will be modulated.

2 Adjust the modulation frequency and amplitude with the AMP control and the FRQ control.

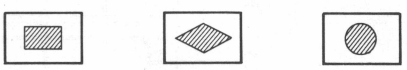
- To lock the wave of the modulation, press the LOCK button so that the button lights up.
- The edge of rotary wipe patterns cannot be modulated.
- The modulation is only effective on wiping between A bus and B bus.

Positioner (shifting the center position)
For three patterns of the standard wipe patterns, the center position can be shifted. This effect is effective only when wiping between A bus and B bus.

1 Press the POSITION ON button so that the button lights up.

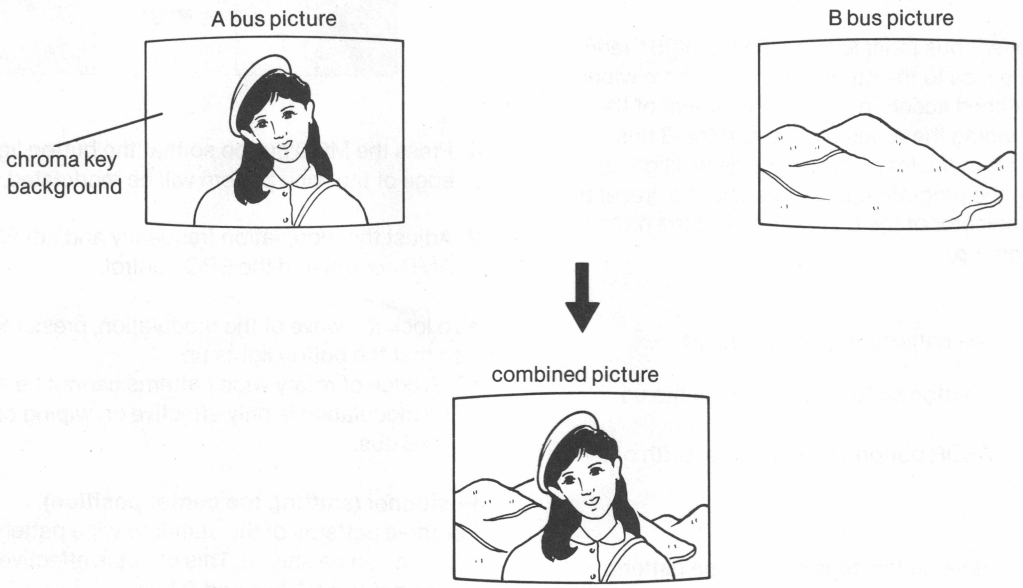
2 Move the POSITION lever to adjust the center position of the pattern.

Patterns with the positioner capability

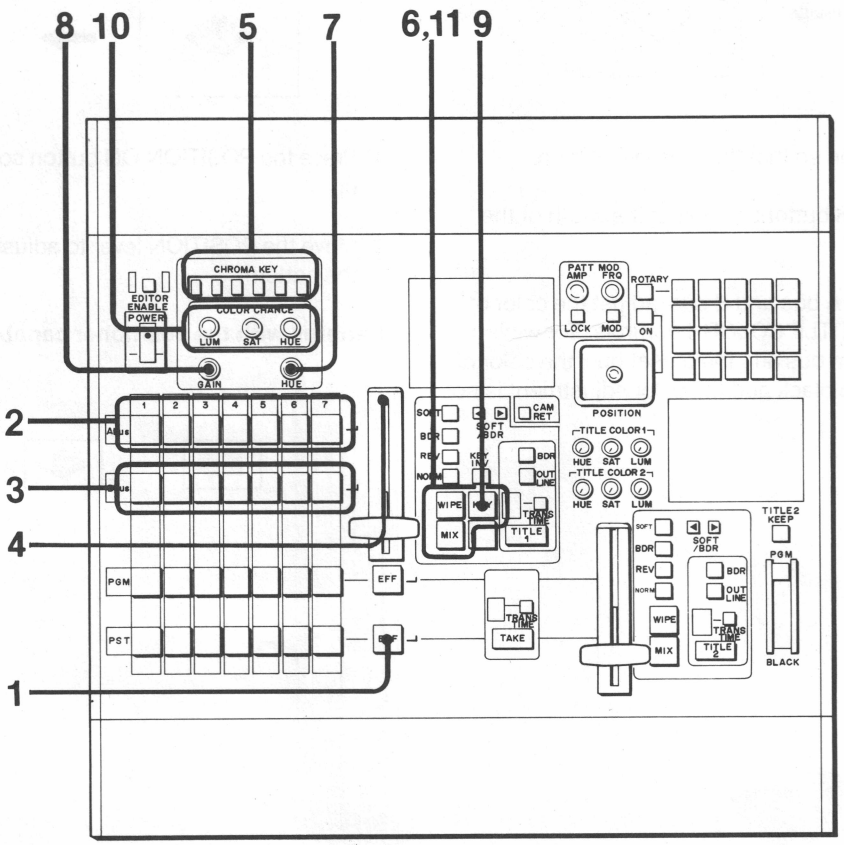


1-4-5. Chroma Key

Chroma key operation is possible by using the A bus/B bus. Normally, the B bus picture is keyed in by using the A bus picture as the chroma key signal.



Operation



1 Press the EFF button of the PST bus select buttons.

2 Select the signal to be used for the chroma key with the A bus select buttons.

3 Select the picture to be keyed in with the B bus select buttons.

4 Slide the fader lever to the A side.

5 Press the color select button corresponding to the color used for the chroma key.

6 Observing the preview monitor, press the KEY button with the MIX button or with the WIPE button. (Refer to "Key mixing/key wiping operation".) The B bus picture is keyed into the A bus picture.

7 Observing the preview monitor, adjust the hue of the keyed picture with the HUE control properly.

8 Adjust the level of the keyed signal with the GAIN control.

9 Press the KEY button. The COLOR CANCEL button will light up and the unit will enter the color cancel mode.

10 Observing the preview monitor, adjust the HUE, SAT and LUM controls so that the chroma key color becomes an achromatic color.

11 Press the KEY button with the MIX button or with the WIPE button. (Refer to "Key mixing/key wiping operation".)

- To obtain the combined picture with the A bus portion and the B bus portion reversed, press the KEY INV button so that the button lights.

Key mixing/key wiping operation

To switch the picture combined by using the chroma key to the B bus picture, slide the fader lever to the opposite side. Switching can be done while mixing the two pictures (key mixing) or wiping them (key wiping). When the KEY and MIX buttons are pressed in step 6, key mixing is selected. When the KEY and WIPE buttons are pressed, key wiping is selected.

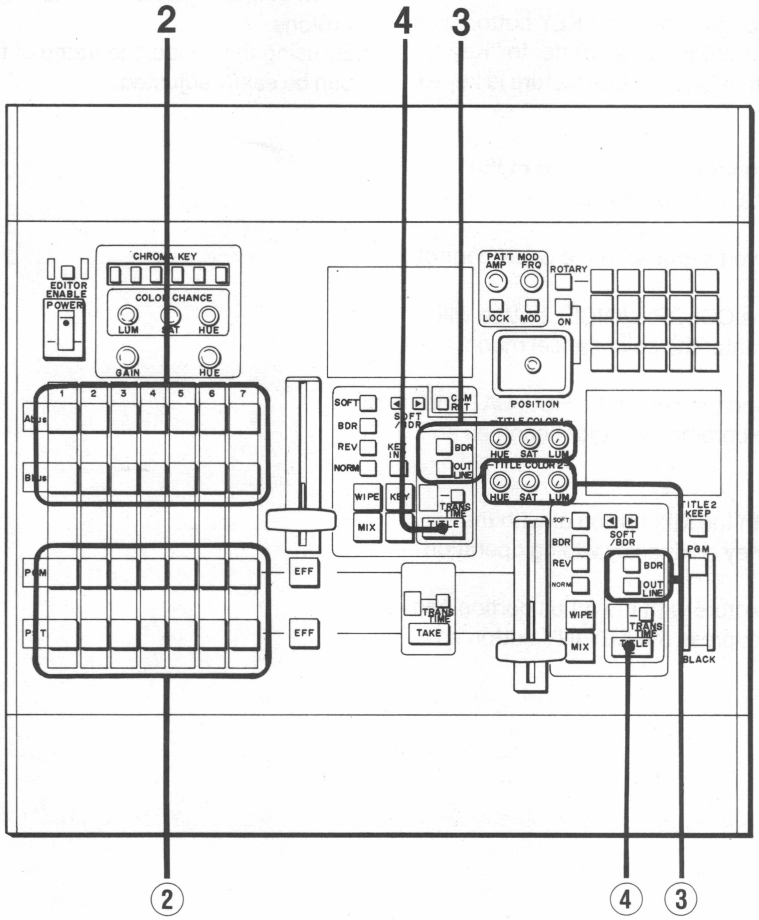
Adjusting the picture frame

When the CAM RET button is depressed and the button lights, the effect of the A bus/B bus will be output as a return video output regardless of the selection by the PGM select buttons.
By using this mode, the frame of the picture for chroma key can be easily adjusted.

1-4-6. Superimposing the Title

Titles can be superimposed into the output signal of the A bus/B bus and that of the program bus/preset bus. The signal from a camera connected to the TITLE 1 connector is superimposed into the A bus/B bus output. The signal from a camera connected to the TITLE 2 connector is superimposed into the program bus/preset bus output.

Operation



1 Adjust the camera for shooting the title.

2 Select the destination picture with the A bus/B bus select buttons or the program/preset buttons.

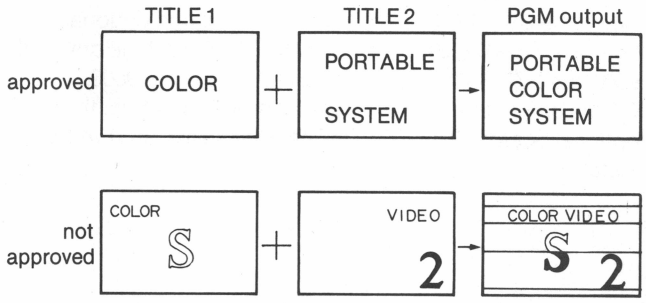
3 When adding a special effect to the title, select the effect. For details on the effects, refer to the respective description below.

4 When the title is to be inserted into the A bus/B bus output, press the TITLE 1 button. When the title is to be inserted into the program/preset bus output, press the TITLE 2 button. The depressed button will light up and the title will be superimposed.

- When the TITLE 1 or TITLE 2 button is briefly (within 0.5 second) pressed, the title is superimposed by cut. When the button is pressed for a while, the title is superimposed by fade-in in the time set with the TRANS TIME button.

Note

When using both titles 1 and 2 simultaneously, be sure to adjust the positions of the titles to avoid their being superimposed overlapping each other.



To erase the title

Press the TITLE 1 or TITLE 2 button again. When the button is briefly pressed, the title is erased by cut. When the button is pressed for a longer time, the title is erased by fade-out.

Setting the fade time

Press the TRANS TIME set button so that the desire time is displayed in the indication window on the left. Each push on the button changes the time by 20 frames. The maximum setting time is 180 frames (6 seconds).

Special effects for title characters

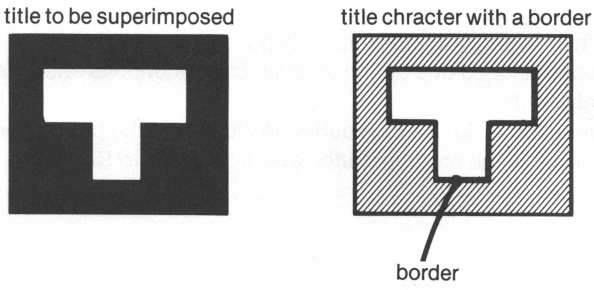
It is possible to give a border to the title characters and to key in only the outline of characters. For the title characters themselves, the border (only for A bus/B bus) and the outline can be colored as desired.

Adjusting the title character color

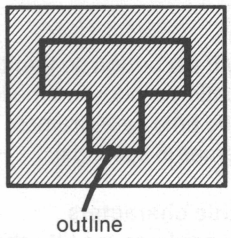
The color of the title characters in the A bus/B bus picture is adjusted with the TITLE COLOR 1 controls and in the color of those program bus/preset bus picture is adjusted with the TITLE COLOR 2 controls.
Adjust the hue with the HUE control, the color saturation with the SAT control and the luminance with the LUM control.

Bordering the title

Press the BDR button of the TITLE 1 or TITLE 2 control section. The superimposed title will be bordered. The border color of title 1 will be a color with a different color phase with that adjusted with the TITLE 2 COLOR controls. Title 2 is always bordered in black only.



Superimposing the outline of the title
Press the OUTLINE button so that the button lights up. Only the outline of the title characters will be superimposed.



Adjusting the title character, border and outline colors

	Title 1	Title 2
Color of title	Color adjusted with the TITLE COLOR 1 controls.	Color adjusted with the TITLE COLOR 2 controls.
Color of border	Color with the nearly reversed phase of the color adjusted with the TITLE COLOR 2 controls.	Black
Color of outline		Color adjusted with the TITLE COLOR 2 controls.

Fading out into black
The program fader lever is normally set on the PGM side. By sliding the lever from the PGM to BLACK after superimposing a title, the program output can be faded out into black.

Keeping the title
When fading out into black, it is possible to leave only the superimposed title on the display. This function is effective only on the title 2.
Press the TITLE 2 KEEP button to illuminate the button and then slide the program fader lever from PGM to BLACK.

1-4-7. Operation on an Editing Control Unit

This unit is equipped with a serial interface (REMOTE 1) and a parallel interface (REMOTE 2). An editing control unit can be connected to either of these interface connectors and the switcher can be remotely controlled. The baud rate switch and the RS232C/422 switch for the REMOTE 1 are provided inside the unit. For details, refer to Section 2 or later.
When controlling from the editing control unit, press the EDITOR ENABLE button so that the button lights up. While this button lights, none of the buttons and controls on the control panel of the switcher are operative and operations must be performed on the editing control unit.

Refer to the instructions furnished with the edting control unit for the operation.

When using the BVE-5000
Use either the REMOTE 1 or REMOTE 2 connector for the connection. The optional BR-5022A and BK-5021 printed circuit boards must be installed in the BVE-5000.

When using the BVE-900
Use the REMOTE 1 connector for the connection. The optional BK-912 printed circuit board must be installed in the BVE-900.

When using the BVE-9000
When the BVE-9000 uses a serial interface, the optional boards BKE-9002, BKE-9600 and BKE-9603, and the optional software BZE-9601 must be installed in the BVE-9000.
On the other hand, when it uses a parallel interface, the optional boards BKE-9002, BKE-9600 and BKE-9631 must be installed.

1-5. SPECIFICATIONS

Television system
1125/60 high definition television system (Tri-level bipolar synchronizing signal format)

System
Resolution: 1125 lines
2 : 1 interlace
Horizontal frequency: 33.75 kHz, 1125 lines/frame
Vertical frequency: 60 Hz

Frequency response
Up to 20 MHz: ±0.3 dB
20 MHz – 30 MHz: + 0.3 dB, –3 dB

Crosstalk
Less than –40 dB (30 MHz)

Linearity (DG)
Less than 2% (APL 50%)

Inputs

VIDEO IN 1 – 7
R, G, B 1 each,
BNC connectors
VS 1 Vp-p, 75 ohms, unbalanced

TITLE IN 1, 2
R, G, B 1 each,
BNC connectors
VS 1 Vp-p, 75 ohms, unbalanced

GEN LOCK IN, OUT (through output)
BNC connectorS
±0.3 V, 75 ohms, unbalanced

Outputs

PGM OUT 1, 2
R, G, B 1 each
BNC connectors
VS 1 Vp-p, 75 ohms, unbalanced

PVW OUT
R, G, B 1 each
BNC connector
V 0.7 Vp-p, 75 ohms, unbalanced

RETURN VIDEO
R, G, B 1 each
BNC connector
VS 1 Vp-p, 75 ohms, unbalanced

VE
R, G, B 1 each
BNC connector
V 0.7 Vp-p, 75 ohms, unbalanced

BL OUT
BNC connector
BLK signal, negative, 2 Vp-p, 75 ohms unbalanced

SYNC OUT 1, 2
BNC connector
±0.3 V, 75 ohms, unbalanced

TALLY
25-pin D-sub multi-connector
(for inputs 1 through 7 and titles 1 and 2)
Contact closure, 0.5 A max.

Interface connectors

VE
15-pin D-sub connector

REMOTE 1 (SIO)
9-pin D-sub connector

REMOTE 2 (PIO)
50-pin D-sub connector

Power requirements
100 – 120 V and 220 – 240 V AC ±10% (selectable), 50/60 Hz

Power consumption
160 W

Operating temperature
0°C to 40°C (32°F to 104°F)

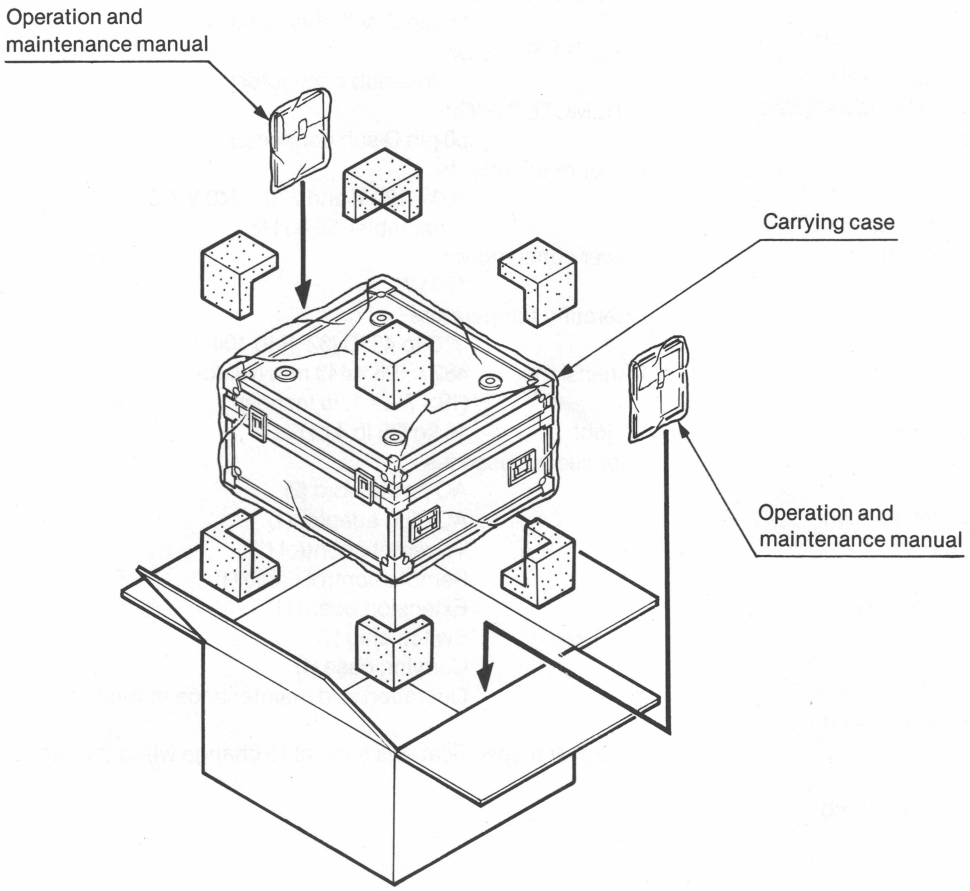
Dimensions
482 × 196 × 443 mm (w/h/d)
(19 × 7¾ × 17½ inches)

Weight
16 kg (35 lb 4 oz)

Supplied accessories
AC power cord (2)
AC plug adaptor (1)
VE remote control (1)
Remote control cable (1)
Extension board (1)
Switch chip (1)
Carrying case (1)
Operation and maintenance manual (1)

Design and specifications subject to change without notice.

1-6. PACKING

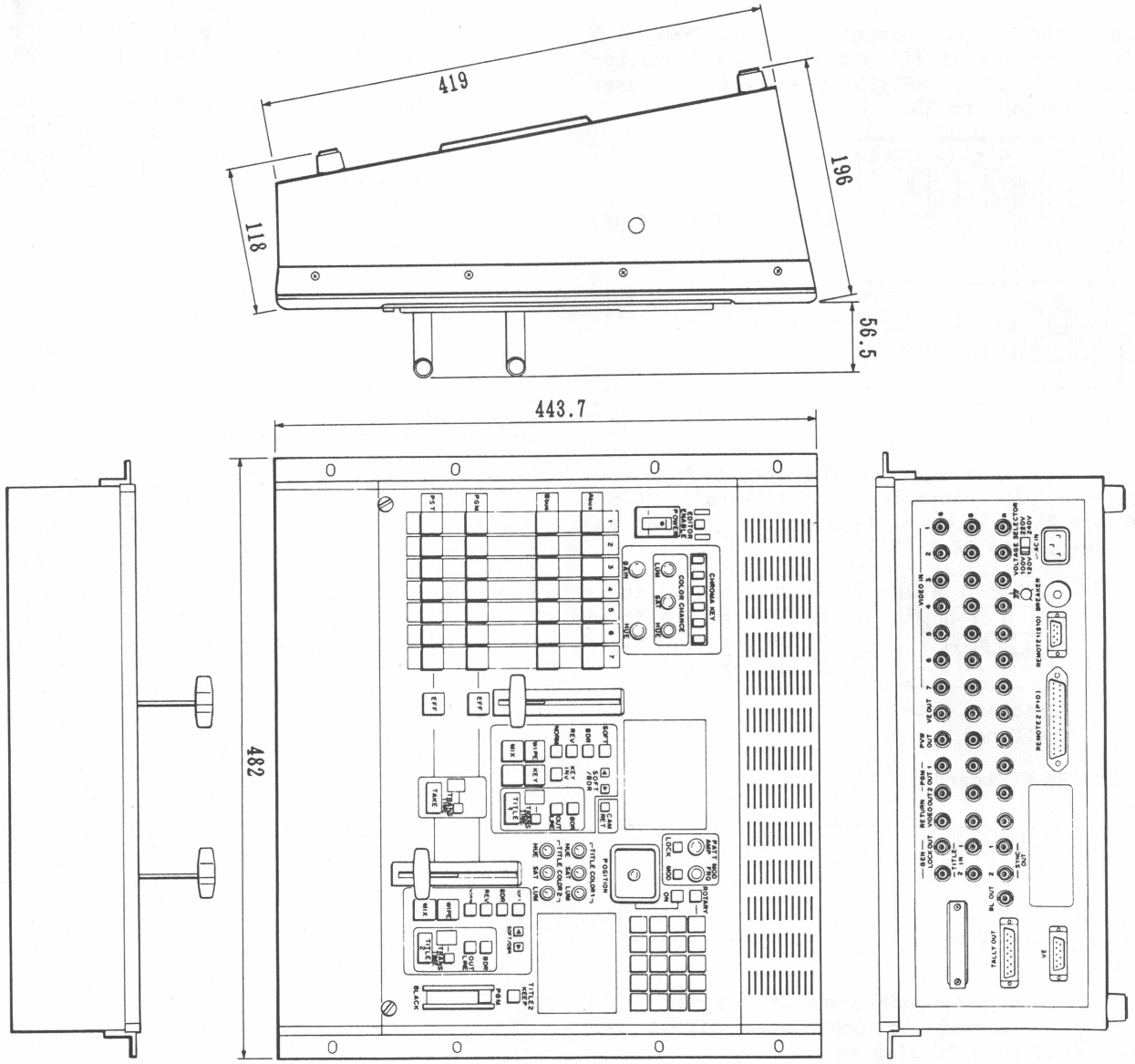

Operation and
maintenance manual
Carrying case
Operation and
maintenance manual

SECTION 2
INSTALLATION

2-1. Operating Environment

. Allow adequate air circulation to prevent internal heat build-up. Never block the ventilation slots on the top cover.
. The operating temperature of the unit should be 0°C to 40°C. Do not install the unit in a location near heat sources.

2-2. Dimensions of the Unit



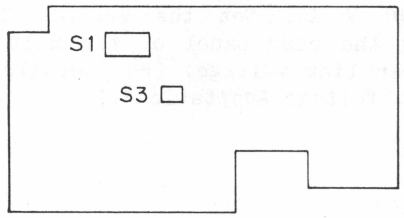
Unit: mm

2-3. Operating Voltage

The HDS-1000/1000T operates on 100 - 120 V or 220 - 240 V AC. Set the VOLTAGE SELECTOR switch on the rear panel of the unit to the local power line voltage. (For details, refer to "1-3-1. Voltage Adaptation".)

2-4. Select switch setting

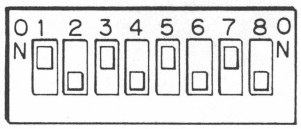
1) SY-63 PC board



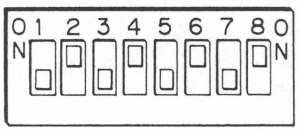
SY-63 PC board (parts side)

i) S1

Select the output signal from the REMOTE 1 (SIO) connector (D SUB 9-pin) on the connector panel to RS422 or RS232C. (The unit is preset at the factory to RS422)



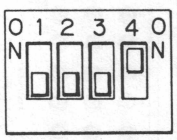
RS422
(Factory presetting)



RS232C

ii) S3

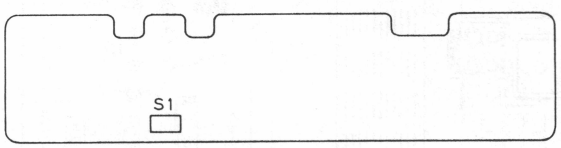
Select the baud rate of the output from the REMOTE 1 (SIO) connector (D SUB 9-pin) to 4.8, 9.6, 19.2 or 38.4 Kb. (The unit is preset at the factory to 38.4 Kb.)



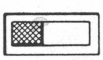
1: ON for 4.8 Kb
2: ON for 9.6 Kb
3: ON for 19.2 Kb
4: ON for 38.4 Kb

(Factory pre-setting)

2) SG-139 PC board



i) Select the outputs from CN5, 6 and 7 to color bar signal or crosshatch signal for adjustment of WIPE diagram.
(Normally set to CB.)

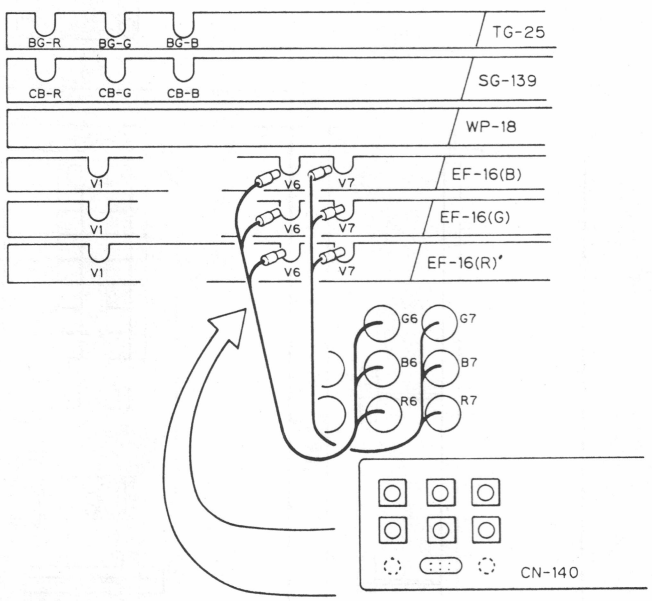
(Crosshatch)  (Color bar)

CH CB

2-5. Increase of the Video Inputs

Pin No. 6 and 7 of the VIDEO IN connector are fixed for the COLOR BAR and BACKGROUND signals respectively. If pin No. 6 and 7 are used for increasing the video inputs, change the internal wiring as follows:

1. Disconnect the cables between the BG-R, BG-G and BG-B front connectors on the TG-25 PC board and the V7 front connectors on the EF-16 B/G/R PC boards.
2. Disconnect the cables between the CB-R, CB-G and CB-B front connectors on the SG-139 PC board and the V6 front connectors on the EF-16 B/G/R PC boards.
3. Disconnect the G-V7, B-V7 and R-V7 cables from the CN7, 8 and 9 connectors on the CN-140 PC board and connect these cables to the V7 front connectors on the EF-16 B/G/R PC boards, aligning the R, G and B connectors correctly.
4. Disconnect the R-V6, G-V6 and B-V6 cables from the CN6, 10 and 11 connectors on the CN-140 PC board and connect these cables to the V6 front connectors on the EF-16 B/G/R PC boards.



2-6. Input and Output Signal of the Connectors

1. TALLY OUT connector (25-pin, female)

Pin No.	SIGNAL	SPEC	Pin No.	SIGNAL	SPEC
1	VIDEO 1 TALLY	Contact closure, 0.5A max	15	TITLE 1 TALLY	Contact closure, 0.5A max
2	VIDEO 1 (RETURN)		16	TITLE 1 (RETURN)	
3	VIDEO 2 TALLY	Contact closure, 0.5A max	17	TITLE 2 TALLY	Contact closure, 0.5A max
4	VIDEO 2 (RETURN)		18	TITLE 2 (RETURN)	
5	VIDEO 3 TALLY	Contact closure, 0.5A max	19	(Spare)	
6	VIDEO 3 (RETURN)		20	(Spare)	
7	VIDEO 4 TALLY	Contact closure, 0.5A max	21	(Spare)	
8	VIDEO 4 (RETURN)		22	(Spare)	
9	VIDEO 5 TALLY	Contact closure, 0.5A max	23	(Spare)	
10	VIDEO 5 (RETURN)		24	(Spare)	
11	VIDEO 6 TALLY	Contact closure, 0.5A max	25	(Spare)	
12	VIDEO 6 (RETURN)				
13	VIDEO 7 TALLY	Contact closure, 0.5A max			
14	VIDEO 7 (RETURN)				

2. VE connector (15-pin) (for connection of the supplied VE remote controller)

Pin No.	SIGNAL	SPEC	Pin No.	SIGNAL	SPEC
1	VED 0	VE bus switch	9	+5V OUT	+5V for VE
2	VED 1	data 4-bit	10	+5V OUT	REMOTE CONTROL
3	VED 2	binary code	11	+5V OUT	
4	VED 3	0 - +5V	12	+5V OUT	
5	VO 0	VE bus select	13	GND	GND for VE
6	VO 1	data 4-bit	14	GND	REMOTE CONTROL
7	VO 2	binary code	15	GND	
8	VO 3	0 - +5V			

3. REMOTE 1 connector (9-pin, female) (For details, refer to the manual of the BK-5022A).

Pin No.	SIGNAL	SPEC	Pin No.	SIGNAL	SPEC
1	GND		6	TRANSMIT COMMON	EIA RS-422
2	TRANSMIT A		7	TRANSMIT B	(38.4Kb/S)
3	RECEIVE B	EIA RS-422	8	RECEIVE A	
4	RECEIVE COMMON	(38.4Kb/S)	9	GND	
5	(Spare)				

4. REMOTE 2 connector (50-pin, female) (For details, refer to the manual of the BK-5021.)

Pin No.	SIGNAL	SPEC	Pin No.	SIGNAL	SPEC
1			26	XPT B BUS 2	
2			27	XPT B BUS 3	
3			28	XPT B BUS 4	0V: active
4			29	XPT B BUS 5	+9V: inactive
5			30	XPT B BUS 6	
6			31	XPT B BUS 7	
7			32	XPT B BUS 8	
8			33		
9			34	DSK FADE TO	0 - -5V (BLACK)
10			35	BLACK A-VIDEO	(PGM)
11			36		0 - -5V (ON)(OFF)
12			37	PATT. SEL 0	5-Bit binary code
13			38	PATT. SEL 1	37PIN (LSB)
14			39	PATT. SEL 2	41PIN (MSB)
15			40	PATT. SEL 3	0V:1
16			41	PATT. SEL 4	+9V:0
17	XPT A BUS 1		42	PATT. SHIFT	0V:non shift +9V: shift
18	XPT A BUS 2		43	MIX MODE	
19	XPT A BUS 3		44	WIPE MODE	0V:active
20	XPT A BUS 4	0V:active	45	DIRECT MODE	+9V:inactive
21	XPT A BUS 5	+9V:inactive	46	KEY MODE	
22	XPT A BUS 6		47	NORMAL	
23	XPT A BUS 7		48	REVERSE	0V:reverse/normal reverse+9V:normal
24	XPT A BUS 8		49	GND	
25	XPT B BUS 1		50	GND	

2-7. Connectors

When connecting the cables to the connectors on the connector panel for installation or maintenance of the unit, attach the following connectors or equivalents to the cables.

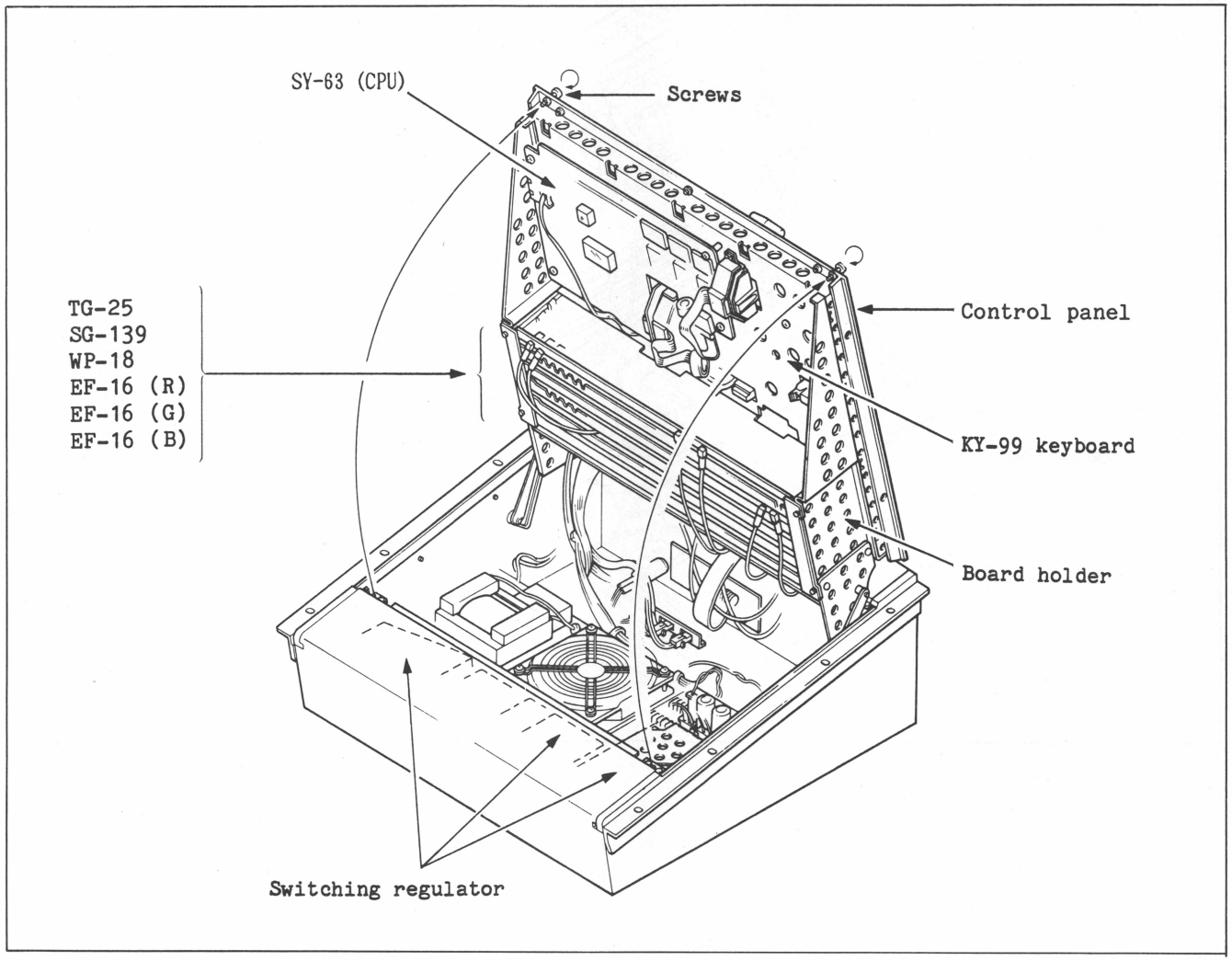
Indication on Connector Panel		Connector to be attached
REMOTE 1	(9P FEMALE)	1-560-651-11 (PLUG-9P MALE) 1-561-749-00 (JUNCTION SHELL, 9P)
VE	(15P FEMALE)	1-564-592-11 (PLUG, D-SUB 15P)
TALLY OUT	(25P FEMALE)	1-564-747-11 (PLUG, D-SUB 25P)
REMOTE 2	(50P FEMALE)	1-561-313-11 (50P MALE DDK57-30500R or equivalents)
IN LOCK OUT	(BNC)	1-560-069-11 (PLUG BNG)
BNC	(1-563-293-11)	

3-1. Note on Servicing

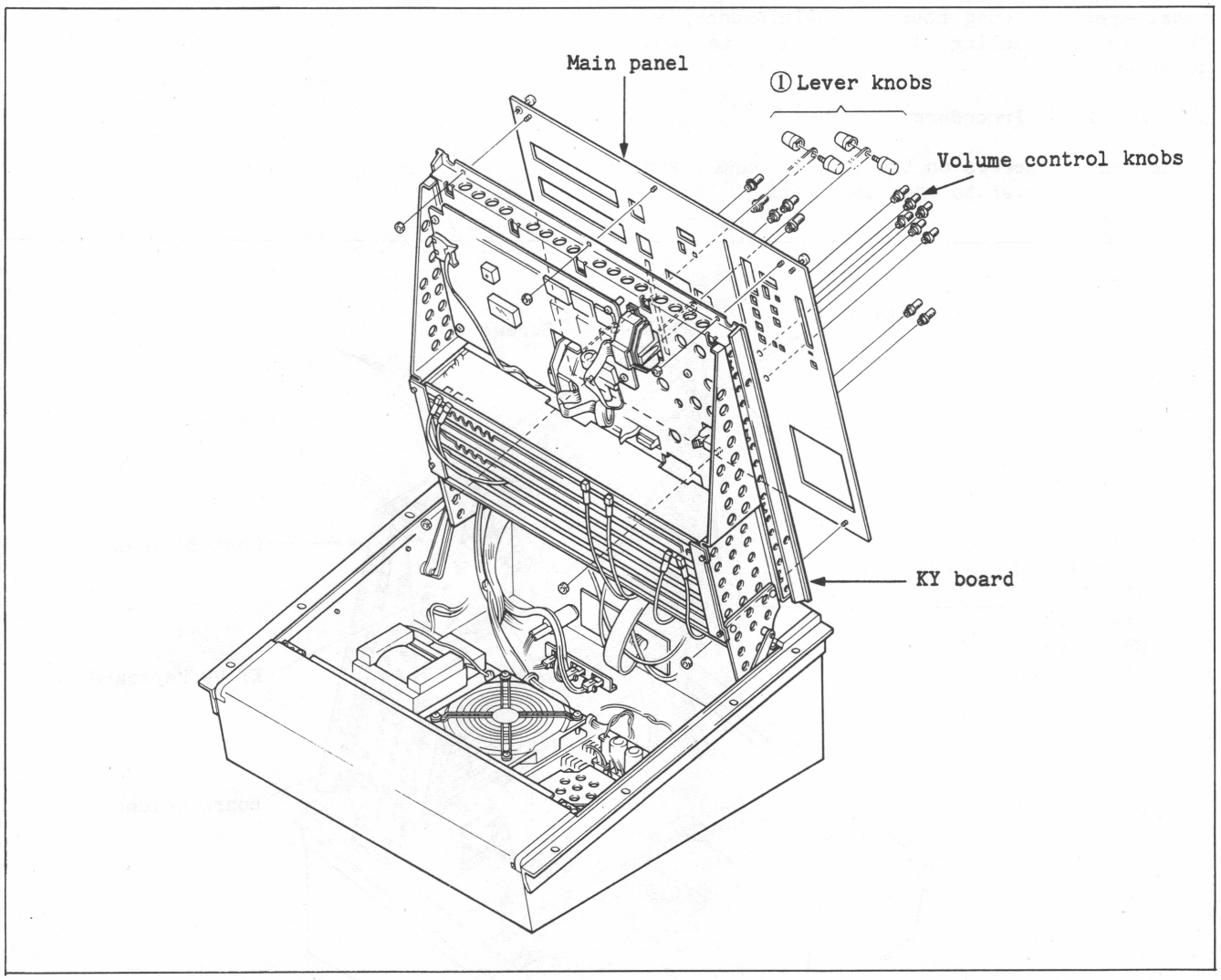
Avoid adjusting the unit with the control panel open for long hours on maintenance, as the forced cooling by the fan is not activated.

3-2. Servicing Procedure

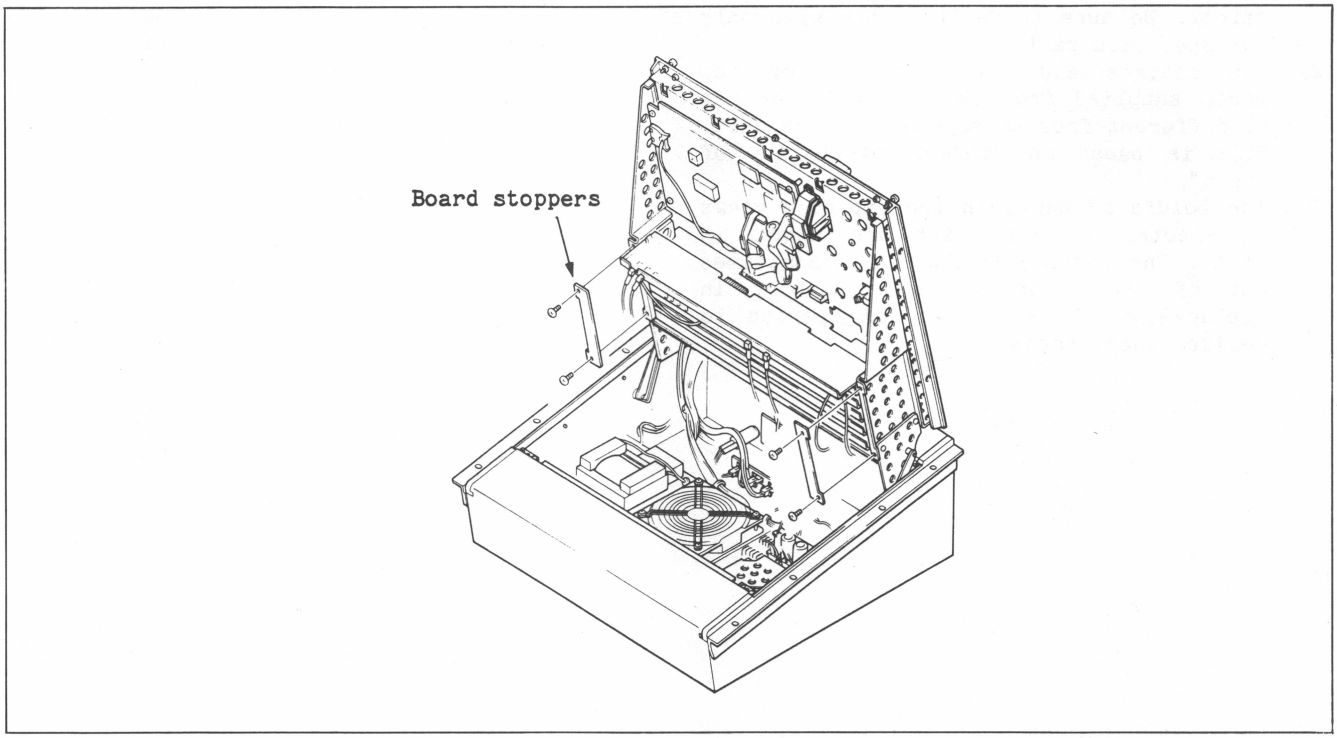
. Loosen the screws on the control panel, and raise the lever to open the panel.



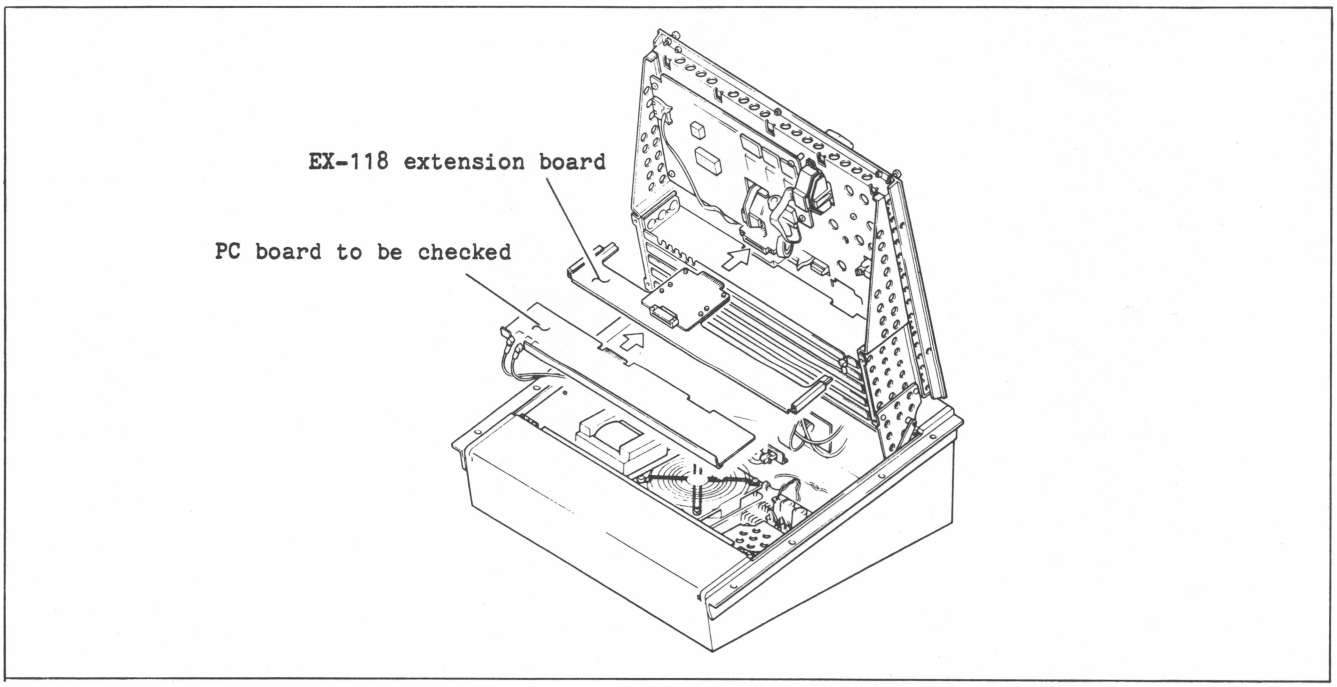
. Remove the 6 nuts, the 2 knobs of the lever and 13 knobs of the volume controls from the control panel, so that the KY board can be seen.



. Remove the board stoppers and pull out the PC boards (TG-25, SG-139, WP-18, EF-16 (R)/(G)/(B)) by inserting fingers into the opening between the PC boards and the holder.



. Use the supplied extension board (EX-118) to adjust or check the TG, SG, WP or EF PC board.



3-3. Spare Parts

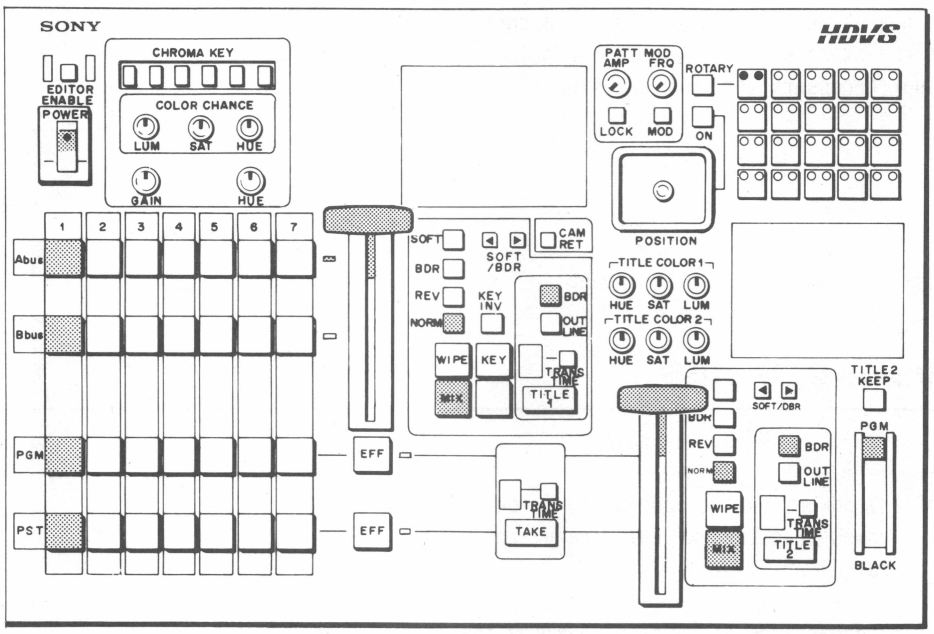
1) Critical safety parts
   The parts marked with ⚠ or ▒▒ in the circuit diagrams, exploded views, and electrical parts list are critical for safety. Be sure to replace them with only the specified parts.
2) The designs and specifications of the parts supplied from the parts center may be different from those used for the unit. This is based on "interchangeability of parts".
3) The boldfaced parts in the exploded views or electrical parts list are always in stock. The parts lightfaced are sometimes out of stock due to low frequency in replacement. It may take long period to deliver these parts.

SECTION 4

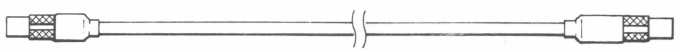
ADJUSTMENT PROCEDURE

[Preparation]

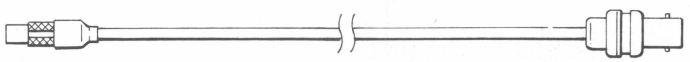
・Set the control panel in the following settings as shown in the figure. (This will be called the "pre-set" condition here after.)



・For performing adjustment procedure, each of the two following special parts are needed.
RF connector cable (Sony parts No. : 1-938-283-21)



BNC connector cable (Sony parts No. : 1-938-290-31)



[Caution]

・The select "DC" and "NORMAL" modes of the oscilloscope should be assumed unless otherwise specified.
・Once the RF connector or cable is temporarily removed for adjustment, take utmost care not to cause a short-circuit by contacting them with other components.
・You will find "equipment status during adjustment" in each adjustment procedure. It is written on the premise that equipment is already in its pre-set condition, and only points differing from that pre-set condition are shown in each adjustment procedure.
・The alphanumericaly marked figures shown after the adjustment point and adjusting control indicate the location of the addresses on the printed circuit board.

4-1. Power Supply Adjustment

[Description of adjustment]
- Power supply voltages at various points are measured when power supply is an actual load present.

[Pre-caution]
- All printed circuit boards must be plugged into the correct position.
- Measure voltages at the exact specified measuring points for each procedure.
- Extension board is not necessary for this adjustment.

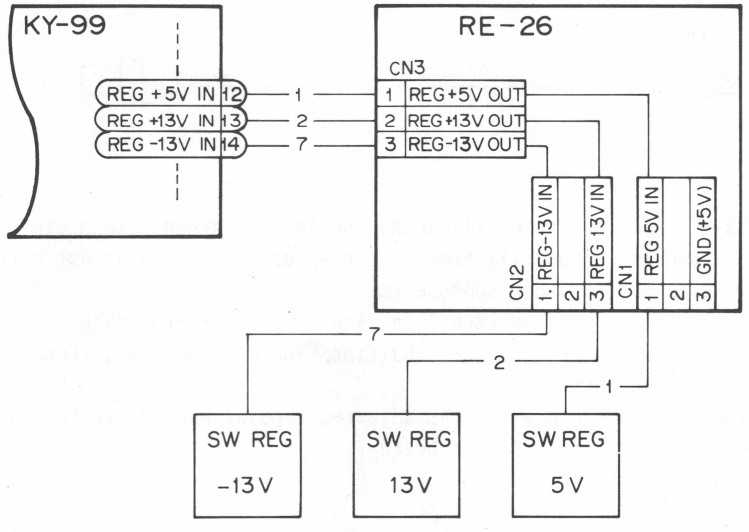
[Equipment required]
- Digital voltmeter

[Preparation]
- Remove the ornamental panel from the control panel.

4-1-1. Confirmation of power supply voltage

Measuring point	Specifications
1. Soldered point of 13V power line at address (J-8) on the KY-99 board. The 13V power line comes from the switching regulator. (GND:TP11/KY-99 board)	13.0±0.05V
2. Soldered point of 5V power line at address (J-8) on the KY-99 board. The 5V power line comes from the switching regulator. (GND: TP11/KY-99 board)	5.0±0.2V
3. Soldered point of -13V power line at address (J-8) on the KY-99 board. The -13V power line comes from the switching regulator. (GND:TP11/KY-99 board)	-13.0±0.05V

Caution: If the above specifications are not satisfied, make the power supply voltage adjustment by turning the potentiometer located on each switching regulator unit (see the following figure). During this adjustment, never turn the potentiometer too quickly because, if turned too quickly, the protection circuit in the switching regulator unit will start to work. Therefore, turn it slowly.



Switching regulator units connection diagram

4-1-2. Regulation voltage adjustment

Measuring point and specification	Adjusting point
1. Lead wire portion of the FB1/TC-25 board (C7) 10.0±0.01V	◐RV1/RE-26 board GND:TP10/TG-25 board (B13)
2. Lead wire portion of the FB2/TC-25 board (C7) -10.0±0.01V	◐RV2/RE-25 board (B13) GND:TP10/TG-25 board (B13)

4-1-3. DC reference level adjustment

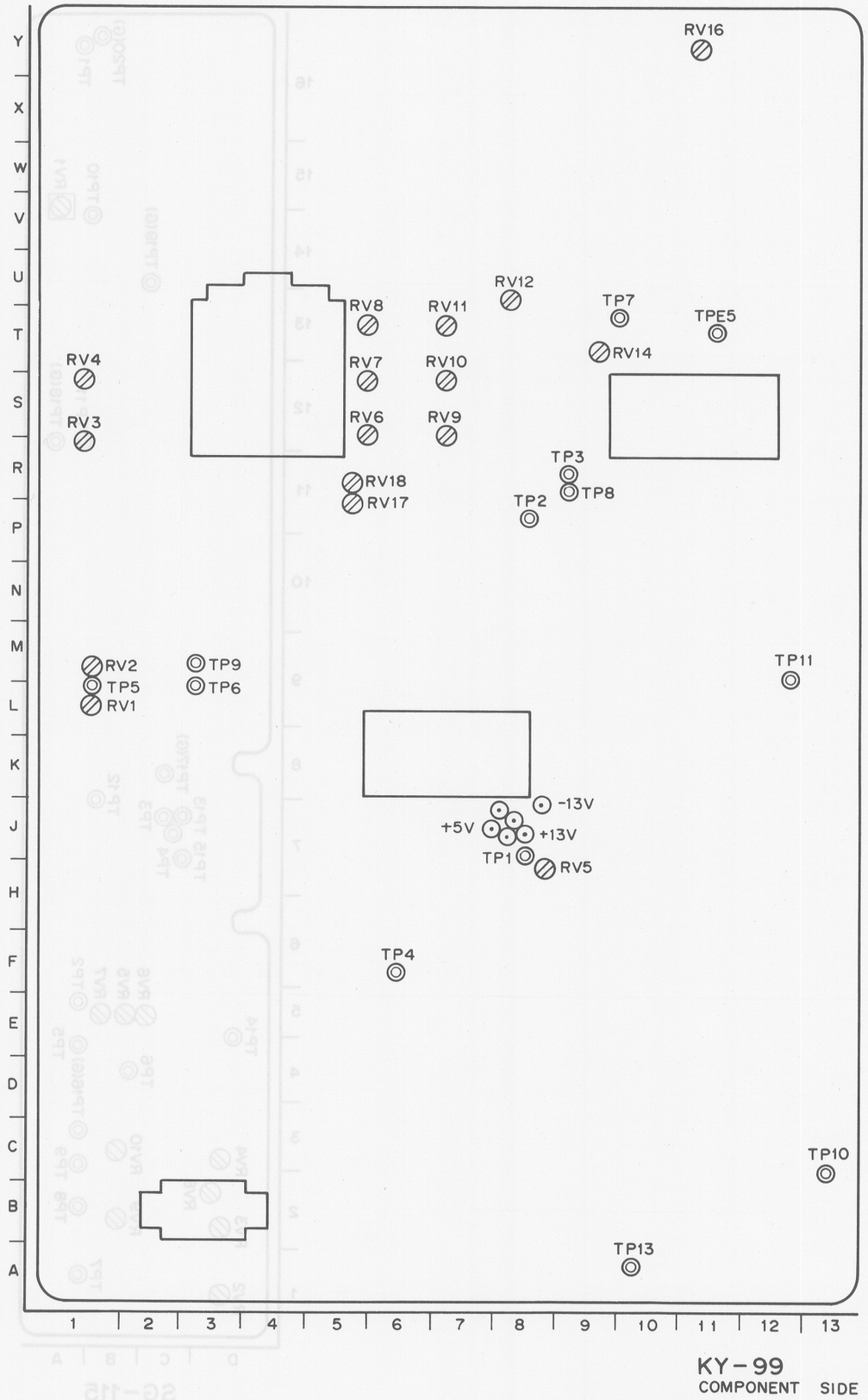
Measuring point and specification	Adjusting point
1. TP5/KY-99 board (M1) 2.5±0.01V	◐RV1/KY-99 board (L1) GND:TP9/KY-99 board (M3)
2. TP6/KY-99 board (M3) -2.5±0.01V	◐RV2/KY-99 board (M1) GND:TP9/KY-99 board (M3)
3. TP7/KY-99 board (U10) 5.0±0.01V	◐RV14/KY-99 board (T9) GND:TP11/KY-99 board (M12)

4-1-4. Position reference voltage adjustment

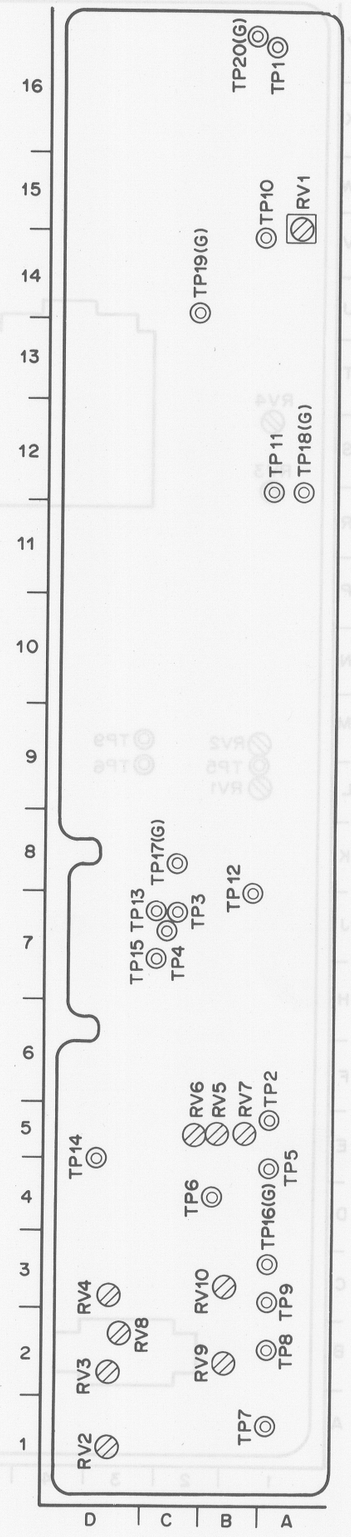
Measuring point and specification	Adjusting point
1. TP8/KY-99 board (R9) 4.8±0.01V	◐RV12/KY-99 board (V8) GND:TP11/KY-99 board (M12)
2. TP3/KY-99 board (R9) 2.4±0.01V	◐RV17/KY-99 board (R5) GND:TP11/KY-99 board (M12)
3. TP2/KY-99 board (P8) 2.4±0.01V	◐RV18/KY-99 board (R5) GND:TP11/KY-99 board (M12)

4-1-5. D/A converter output level setting

Measuring point and specification	Adjusting point
1. TP4/KY-99 board (F6) 2.0±0.01V	◐RV5/KY-99 board (J9) GND:TP11/KY-99 board (M12)



KY-99
COMPONENT SIDE



SG-115
COMPONENT SIDE

4-2. SG-115 Board Adjustment (HDS-1000)

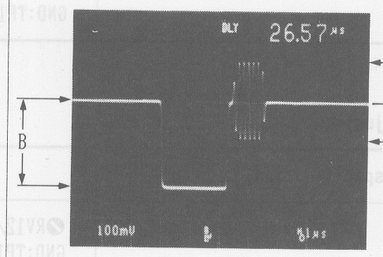
[Description of adjustment]
This section provides procedure to measure the output signal from the SG-115 board and adjust it to specifications. Lock phase adjustment in GEN LOCK mode is also carried out.

[Equipment required]
- Oscilloscope (Dual trace, more than 100MHz)
- Equipment that can supply black burst or composite video signals (for example, HDCS-100, etc.)

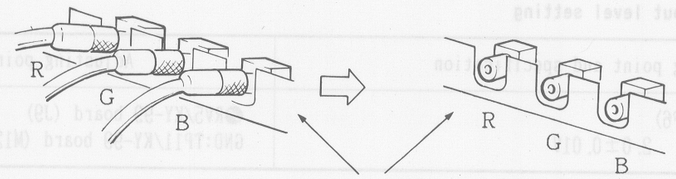
[Cables and components required]
- Extension board EX-118
- BNC connector cable (Sony parts No. : 1-938-290-31)

[Preparation]
- Put the operation panel into pre-set condition.

4-2-1. Black burst signal adjustment

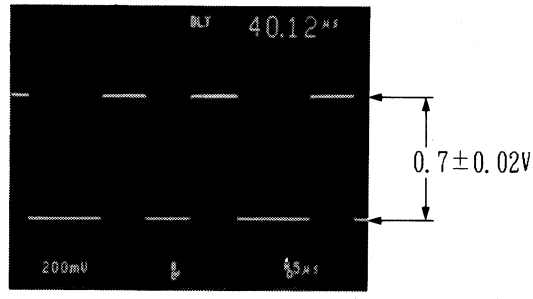
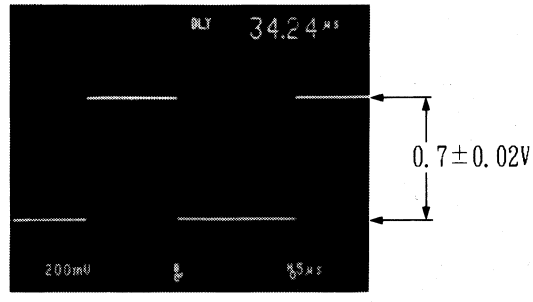
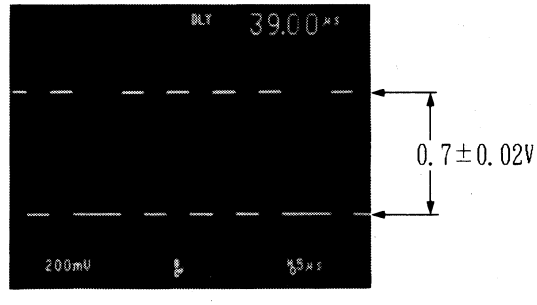
Machine conditions for adjustment	Measuring point and specification	Adjusting point
• Extend the board [SG-115 board] • Oscilloscope [NORMAL MODE]	BLACK BURST OUT: Terminated in 75ohms/ rear panel  A=0.28±0.01V B=0.3±0.01V C=0±0.05V	A:RV5/SG-115 board(B5) B:RV6/SG-115 board(C5) C:RV7/SG-115 board(B5) TRIG:HD:TP15/SG-115 board (C7)

[Equipment setting alteration]
- Remove RF connectors of CN6(R), CN7(G), CN8(B) from the SG-115 board.



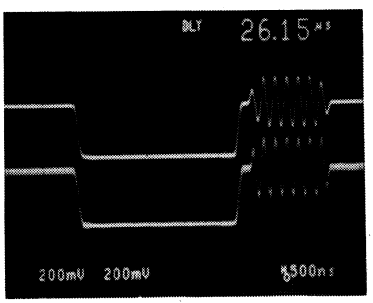
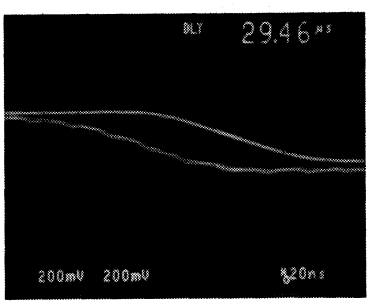
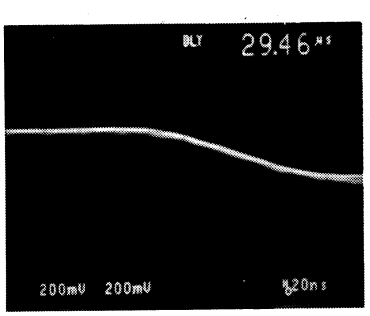
SG-115 board side view

4-2-2. Color bar signal adjustment

Machine conditions for adjustment	Measuring point and specification	Adjusting point
• Extend the board [SG-115 board] • Oscilloscope [NORMAL MODE]	1. CN6 (R OUT): Terminated in 75ohms/ SG-115 board  	◐RV2/SG-115 board (D1) TRIG:HD:TP15/SG-115 board (C7)
	2. CN7 (G OUT): Terminated in 75ohms/ SG-115 board  	◐RV3/SG-115 board (D2) TRIG:HD:TP15/SG-115 board (C7)
	3. CN8 (B OUT): Terminated in 75ohms/ SG-115 board  	◐RV4/SG-115 board (D2) TRIG:HD:TP15/SG-115 board (C7)

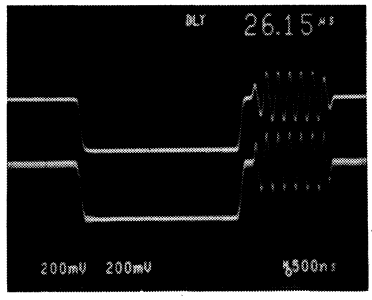
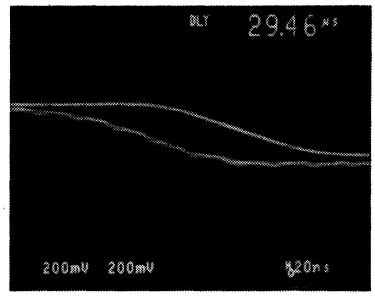
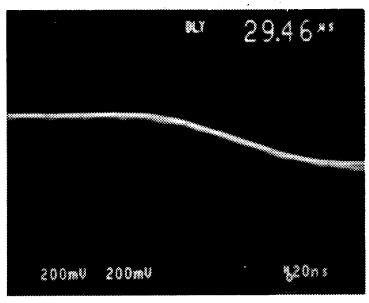
[Setting alteration]
- Return the RF connectors of CN6(R), CN7(G), and CN8(B) of the SG-115 board to their original connections.
- Connect the GEN LOCK signal to the GEN LOC IN connector on the rear panel of the HDS-1000.

2-3. GEN lock horizontal phase adjustment

Machine conditions for adjustment	Measuring point and specification	Adjusting point
• Extend the board [SG-115 board] • Oscilloscope [DUAL MODE]	• GEN LOCK OUT: Terminated in 75ohms/ rear panel • BLACK BURST OUT 1: Terminated in 75ohms/ rear panel  enlarged  NG 0 ±5ns  	◐RV1/SG-115 board (A15) TRIG:HD:TP15/SG-115 board (C7)

[Setting alteration]
• Remove the GEN LOCK signal connection.

4-2-3. GEN lock horizontal phase adjustment

Machine conditions for adjustment	Measuring point and specification	Adjusting point
• Extend the board [SG-115 board] • Oscilloscope [DUAL MODE]	• GEN LOCK OUT: Terminated in 75ohms/ rear panel • BLACK BURST OUT 1: Terminated in 75ohms/ rear panel  enlarged  NG 0 ±5ns  	◐RV1/SG-115 board (A15) TRIG:HD:TP15/SG-115 board (C7)

[Setting alteration]
• Remove the GEN LOCK signal connection.

4-2a. SG-139 Board Adjustment (HDS-1000T)

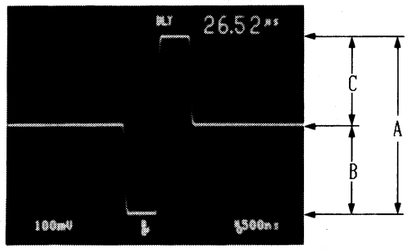
[Description of adjustment]
This section provides procedure to measure the output signal from the SG-139 board and adjust it to specifications. Lock phase adjustment in GEN LOCK mode is also carried out.

[Equipment required]
- Oscilloscope (Dual trace, more than 100MHz)
- Equipment that can supply a three-value sync or composite video signal (for example, HDCS-300, etc.)

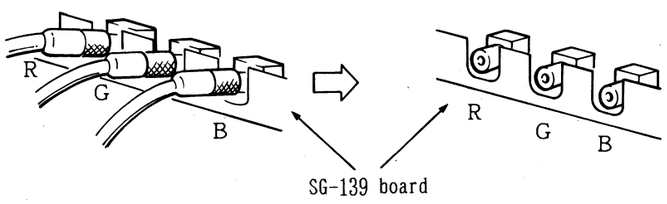
[Cables and component required]
- Extension board EX-118
- BNC connector cable (Sony parts No. : 1-938-290-31)

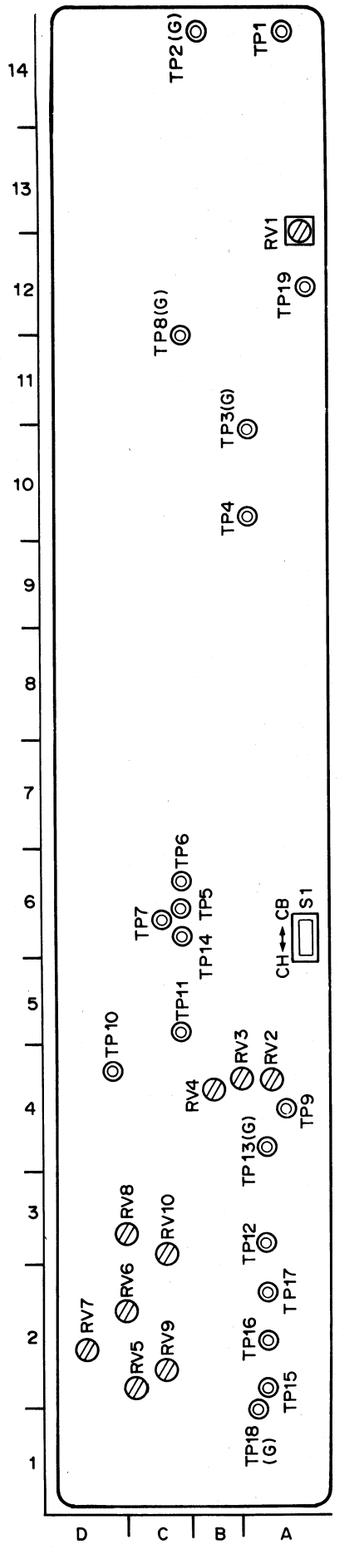
[Preparation]
- Set the operation panel into the pre-set condition.

4-2a-1. Three-value sync signal adjustment

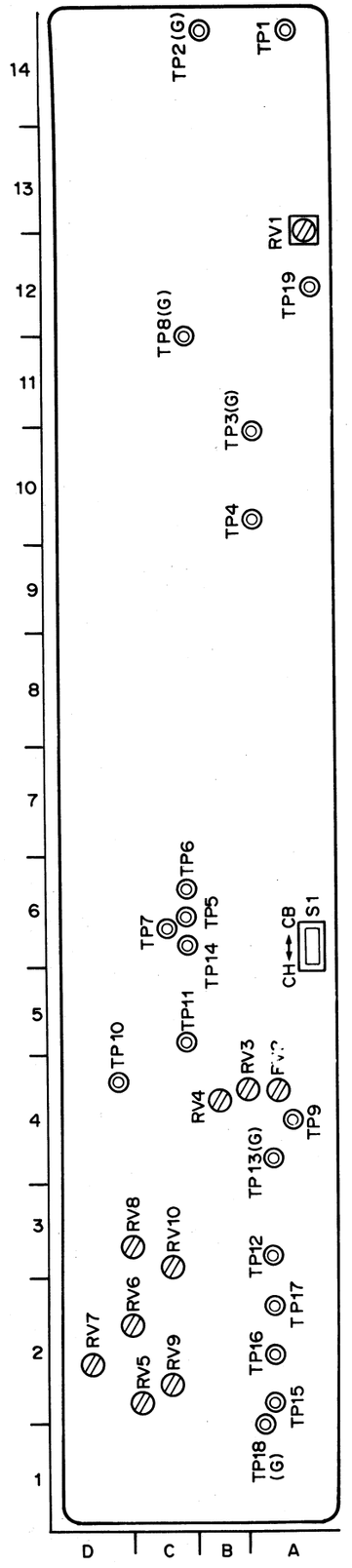
Machine conditions for adjustment	Measuring point and specification	Adjusting point
• Extend the board [SG-139 board] • Oscilloscope [NORMAL MODE] • Switch S1 on the SG-139 board [CB side]	SYNC OUT: Terminated in 75ohms/rear panel  A=0.6±0.006V B=0.3±0.003V C=0.3±0.003V	A:RV4/SG-139 board (B4) B:RV2/SG-139 board (A4) C:RF3/SG-139 board (B4) TRIG:HD:TP14/SG-139 board (C6)

[Setting alteration]
- Remove the RF connectors of CN5(R), CN6(G), and CN7(B) from the SG-139 board.



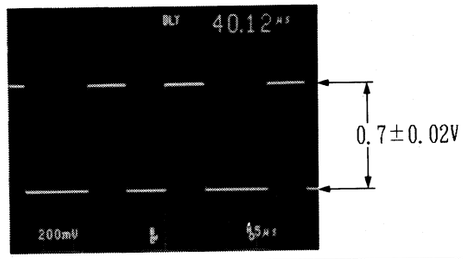
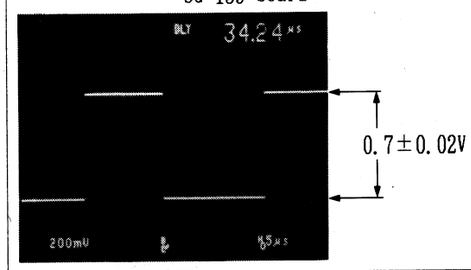
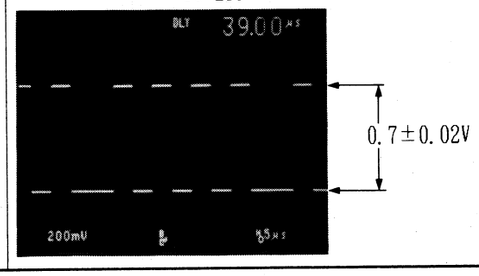


SG-139
COMPONENT SIDE



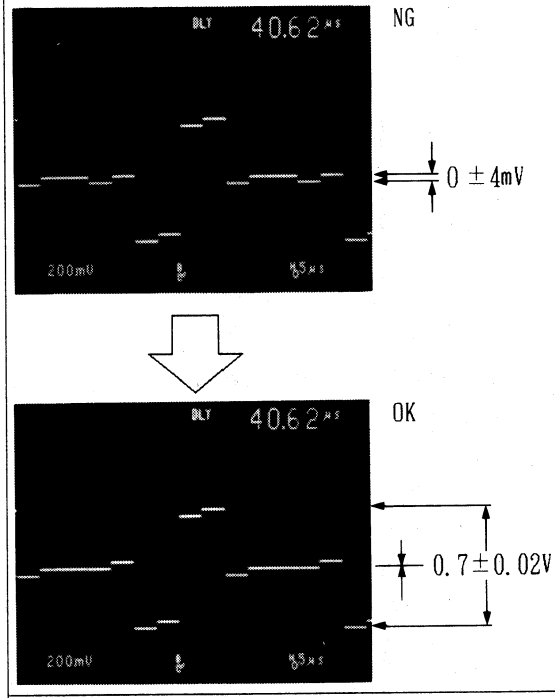
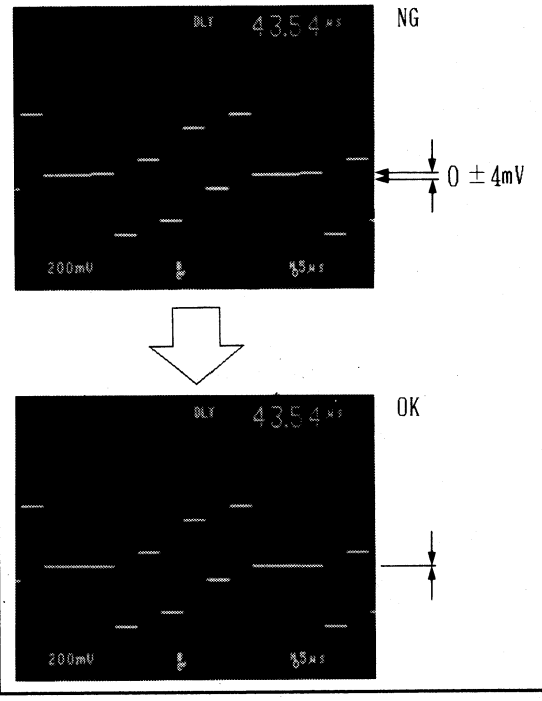
SG-139
COMPONENT SIDE

4-2a-2. Color-bar adjustment-1

Machine conditions for adjustment	Measuring point and specification	Adjusting point
・Extend the board [SG-139 board] ・Oscilloscope [NORMAL MODE]	1. CN5 (R OUT): Terminated in 75ohms/ SG-139 board 	●RV5/SG-139 board (C2) TRIG:HD:TP14/SG-139 board (C6)
	2. CN6 (G OUT): Terminated in 75ohms/ SG-139 board 	●RV6/SG-139 board (D2) TRIG:HD:TP14/SG-139 board (C6)
	3. CN7 (B OUT): Terminated in 75ohms/ SG-139 board 	●RV8/SG-139 board (D3) TRIG:HD:TP14/SG-139 board (C6)

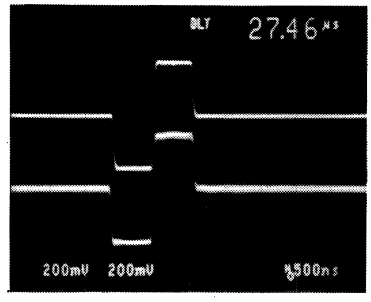
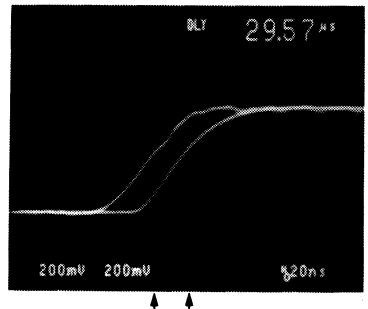
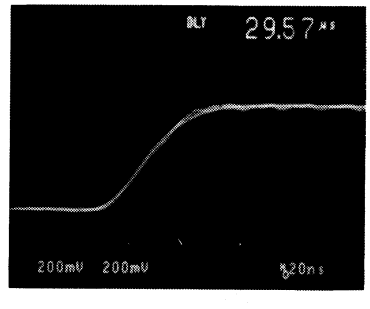
[Setting alteration]
・ Change the connections of the shorting sockets on the SG-139 board, as follows.
SH1 side → SH2 side(C2), SH3 side→SH4 side(C2), SH5 side→SH6 side(C3)

4-2a-3. Color-bar adjustment-2

Machine conditions for adjustment	Measuring point and specification	Adjusting point
• Extend the board [SG-139 board] • Oscilloscope [NORMAL MODE]	1. CN6 (P_R OUT): Terminated in 75ohms/ SG-139 board  	●RV7/SG-139 board (D2) ●RV9/SG-139 board (C2) TRIG:HD:TP14/SG-139 board (C6)
	2. CN7 (P_B OUT): Terminated in 75ohms/ SG-139 board  	●RV10/SG-139 board (C3) TRIG:HD:TP14/SG-139 board (C2)

[Setting alteration]
- Return the shorting socket on the SG-139 board to its original position.
- Return the RF connectors of CN5(R), CN6(G), and CH7(B) to their original connections.
- Connect the GEN LOCK signal to the GEN LOCK IN connector on the rear panel of HDS-1000T.

4-2a-4. GEN lock horizontal phase adjustment

Machine conditions for adjustment	Measuring point and specification	Adjusting point
• Extend the board [SG-139 board] • Oscilloscope [DUAL MODE]	• GEN LOCK OUT: Terminated in 75ohms/ rear panel • SYNC OUT 1: Terminated in 75ohms/ rear panel  enlarged  NG 0 ± 5 ns  OK	●RV1/SG-139 board (A13) TRIG:HD:TP14/SG-139 board (C2)

[Setting alteration after the adjustment]
• Remove the GEN LOCK signal connection.

4-3. Preliminary Adjustment of WP-18 Board

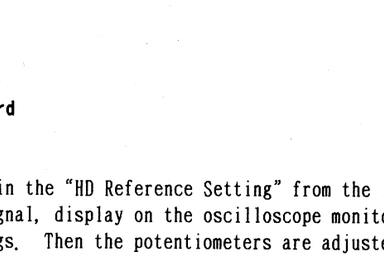
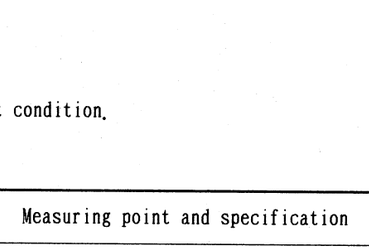
[Description of adjustment]
This section provides procedure to obtain the "HD Reference Setting" from the input HD signal, and the "VD Reference Setting" from the input VD signal, display on the oscilloscope monitor. The waveforms to be adjusted overlap these reference settings. Then the potentiometers are adjusted until the measured waveform meets the specifications.

[Equipment required]
・Oscilloscope (Dual trace, more than 100MHz)

[Cables and component required]
・Extension board EX-118

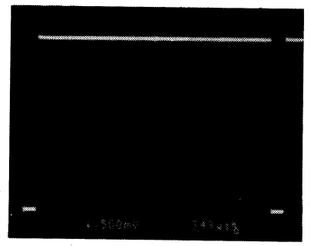
[Preparation]
・Put the operation panel into its pre-set condition.

4-3-1. Reference voltage adjustment-1

Machine conditions for adjustment	Measuring point and specification	Adjusting point
・Extend the board [WP-18 board] ・Oscilloscope [DUAL MODE] ・PGM line select button [EFF] ・PST line slelect button [EFF] ・A-bus/B-bus line WIPE button [ON] ・Wipe select button [◧]	・First, calibrate all the oscilloscope's channel ground level to the same levels. ・TP8/WP-18 board (A9) ・TP9/WP-18 board (A7) Move the A-bus/B-bus line fader lever between top and bottom positions. Fader lever:Top position  Fader lever:Bottom position  A-B=0±20mV	◉RV13/WP-18 board (B7) GND:TP33/WP-18 board (A5)

HD Reference Setting

HD signal: TP15 (GND: TPE2)/SG-115 board (C7)
: TP14 (GND: TP13)/SG-139 board (C6)
Invert the input signal polarity at oscilloscope input. Adjust the SEC/DIV control and H.POSITION control unit the following waveform is obtained.



TRIG: HD

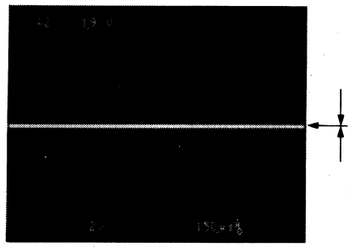
VD Reference Setting

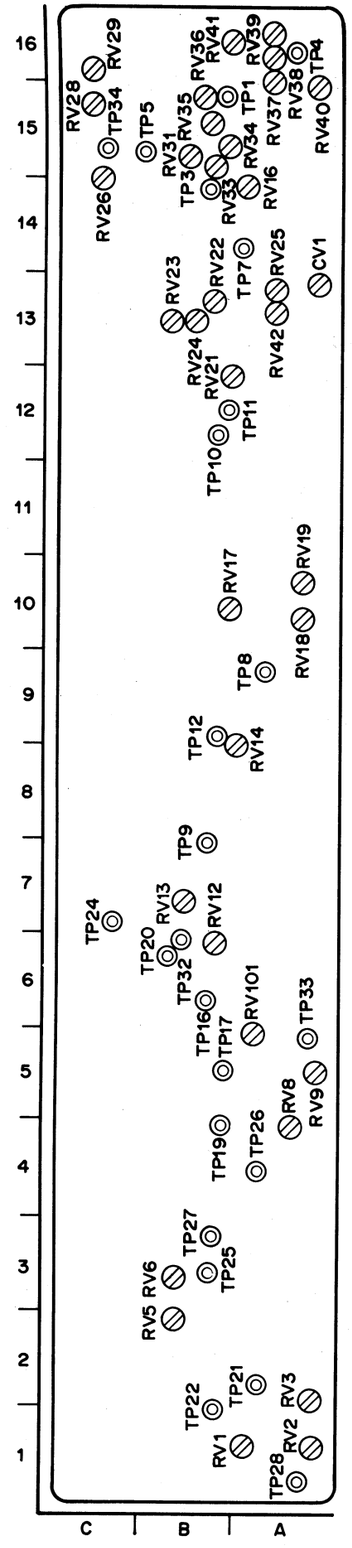
VD signal: TP3 (GND: TPE2)/SG-115 board (C7)
: TP5 (GND: TP13)/SG-139 board (C6)
Invert the input signal polarity at the oscilloscope input. Adjust the SEC/DIV control and H.POSITION control until the following waveform is obtained.

TRIG: VD

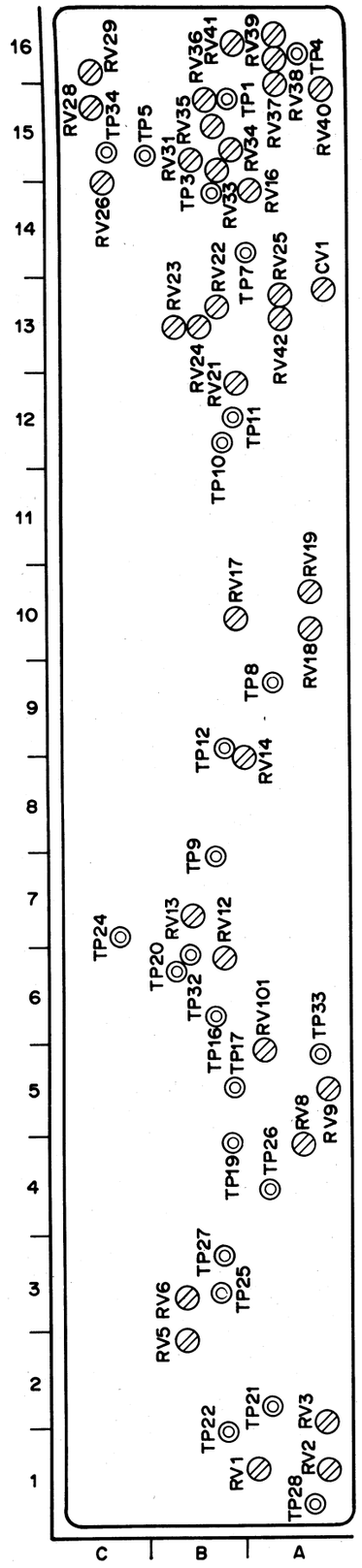
Vertical Position Setting of the Oscilloscope

DC level: TP8 (GND: TP33)/WP-18 board (A9)
Adjust the V.POSITION control until the following waveform is obtained.





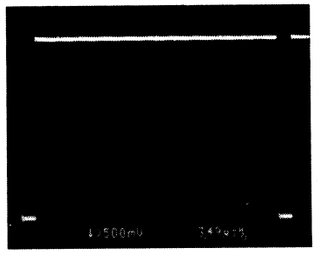
WP-18
COMPONENT SIDE



WP-18
COMPONENT SIDE

HD Reference Setting

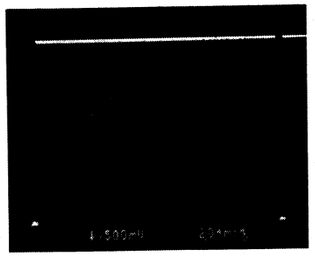
HD signal: TP15 (GND: TPE2)/SG-115 board (C7)
: TP14 (GND: TP13)/SG-139 board (C6)
Invert the input signal polarity at the oscilloscope input.
Adjust the SEC/DIV control and H. POSITION control until the following waveform is obtained.



TRIG: HD

VD Reference Setting

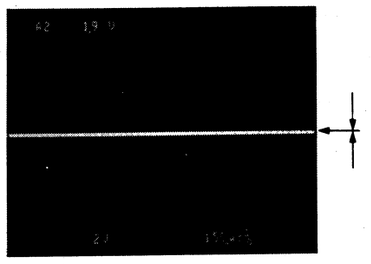
VD signal: TP3 (GND: TPE2)/SG-115 board (C7)
: TP5 (GND: TP13)/SG-139 board (C6)
Invert the input signal polarity at oscilloscope input.
Adjust the SEC/DIV control and H. POSITION control until the following waveform is obtained.



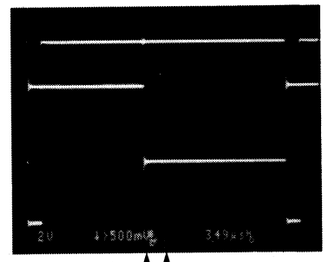
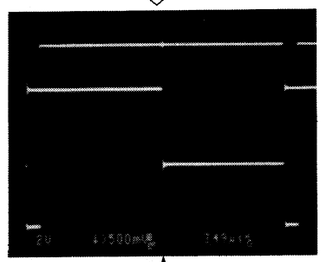
TRIG: VD

Vertical Position Setting of the Oscilloscope

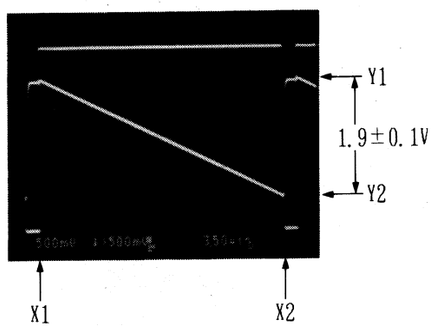
DC level: TP8 (GND: TP33)/WP-18 board (A9)
Adjust the V. POSITION control until the following waveform is obtained.



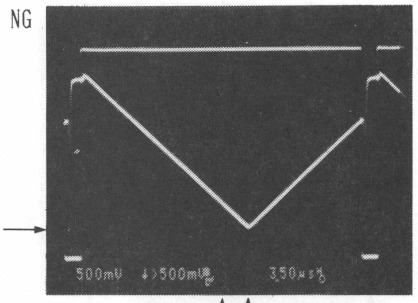
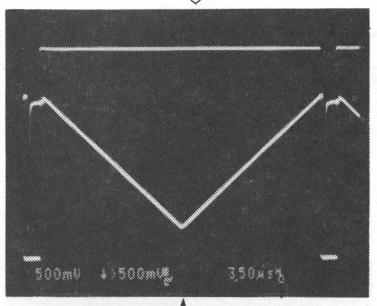
4-3-2. 1/2 horizontal width adjustment

Machine conditions for adjustment	Measuring point and specification	Adjusting point
• Extend the board [WP-18 board] • Oscilloscope [DUAL MODE]	1. Perform the HD Reference Setting.	
	2. IC51 pin13/WP-18 board (A11) NG  A A=0±0.1div OK 	◐RV19/WP-18 board (A10) TRIG:HD:TP15/SG-115 board (C7) :TP14/SG-139 board (C6) GND:TP33/WP-18 board (A5)

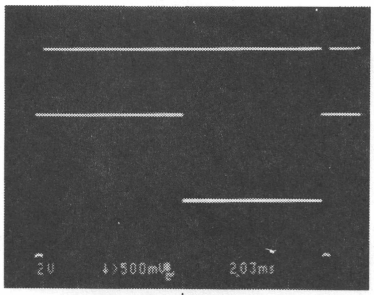
4-3-3. Horizontal ramp level adjustment

Machine conditions for adjustment	Measuring point and specification	Adjusting point
• Extend the board [WP-18 board] • Oscilloscope [DUAL MODE] • A-bus/B-bus line fader lever [bottom position]	1. Perform the HD Reference Setting.	
	2. TP10/WP-18 board (B12)  Y1 1.9±0.1V Y2 X1 X2	◐RV31/WP-18 board (B15) TRIG:HD:TP15/SG-115 board (C7) :TP14/SG-139 board (C6) GND:TP33/WP-18 board (A5)

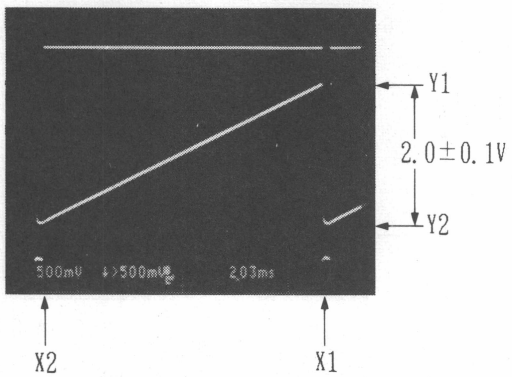
4-3-4. Horizontal triangle center adjustment

Machine conditions for adjustment	Measuring point and specification	Adjusting point
• Extend the board [WP-18 board] • Oscilloscope [DUAL MODE] • Wipe pattern selection button [◆] • A-bus/B-bus line fader lever [top position]	1. Perform the HD standard setting.	
	2. TP10/WP-18 board (B12) NG  A=0±0.1div A OK 	◐RV28/WP-18 board (C5) TRIG:HD:TP15/SG-115 board (C7) :TP14/SG-139 board (C6) GND:TP33/WP-18 board (A5)

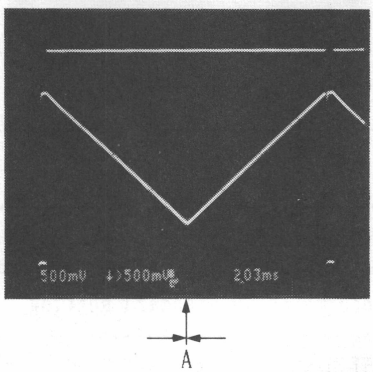
4-3-5. 1/2 vertical width adjustment

Machine conditions for adjustment	Measuring point and specification	Adjusting point
• Extend the board [WP-18 board] • Oscilloscope [DUAL MODE]	1. Perform the VD Standard setting.	
	2. IC51 pin5  A=0±0.1div A	◐RV18/WP-18 board (A15) TRIG:VD:TP3/SG-115 board (C7) TP5/SG-139 board (C6) GND:TP33/WP-18 board (A5)

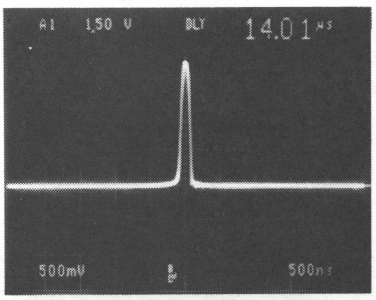
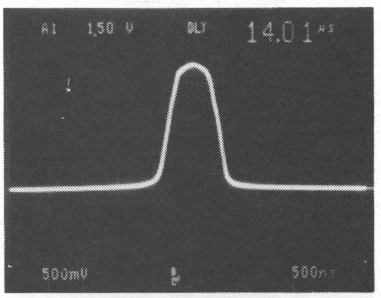
4-3-6. Vertical ramp level adjustment

Machine conditions for adjustment	Measuring point and specification	Adjusting point
• Extend the board [WP-18 board] • Oscilloscope [DUAL MODE] • Wipe pattern selection button [▬] • A-bus/B-bus line fader lever [bottom position]	1. Perform the VD standard setting.	
	2. TP11/WP-18 board (B12)  	⊘RV36/WP-18 board (B15) TRIG:VD:TP3/SG-115 board (C7) TP5/SG-139 board (C6) GND:TP33/WP-18 board (A5)

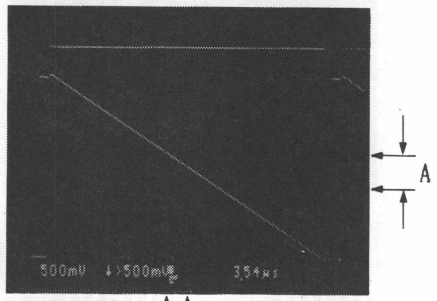
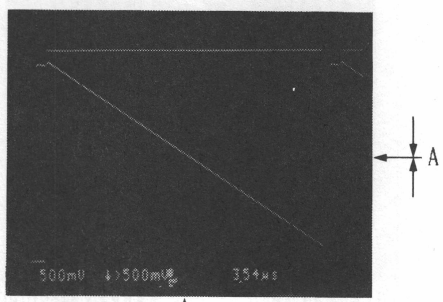
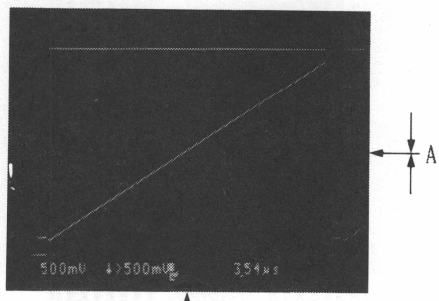
4-3-7. Vertical triangle center adjustment

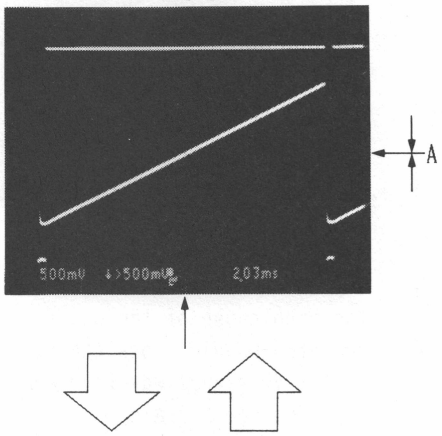
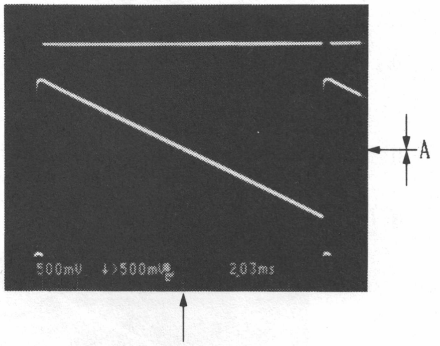
Machine conditions for adjustment	Measuring point and specification	Adjusting point
• Extend the board [WP-18 board] • Oscilloscope [DUAL MODE] • Wipe pattern selection button [◆] • A-bus/B-bus line fader lever [bottom position]	1. Perform the VD standard setting.	
	2. TP11/WP-18 board (B12)  A=0±0.1div	⊘RV29/WP-18 board (B16) TRIG:VD:TP3/SG-115 board (C7) TP5/SG-139 board (C6) GND:TP33/WP-18 board (A5)

4-3-8. A-bus/B-bus line border line center adjustment

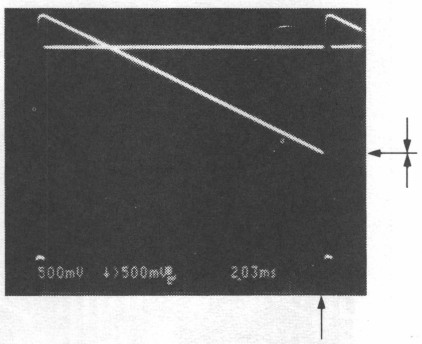
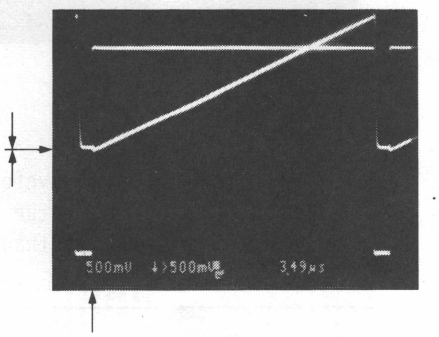
Machine conditions for adjustment	Measuring point and specification	Adjusting point
• Extend the board [WP-18 board] • Oscilloscope [DUAL MODE] • A-bus/B-bus line wipe [BDR] button [ON] • Wipe pattern selection button [▮◧] • A-bus/B-bus line fader [mechanical center position]	1. TP19/WP-18 board (B4) Push the soft/border amount setting button of A-bus/B-bus line so that the width of the border line changes from maximum to minimum. Border line width:Minimum  Border line width:Maximum  The center of this waveform should move as little as possible.	◐RV14/WP-18 board (B8) TRIG:HD:TP15/SG-115 board (C7) :TP14/SG-139 board (C6) GND:TP33/WP-18 board (A5)

4-3-9. Rotary wipe-1 (◧) horizontal and vertical adjustments

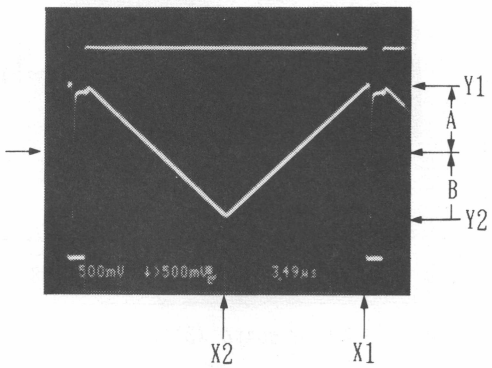
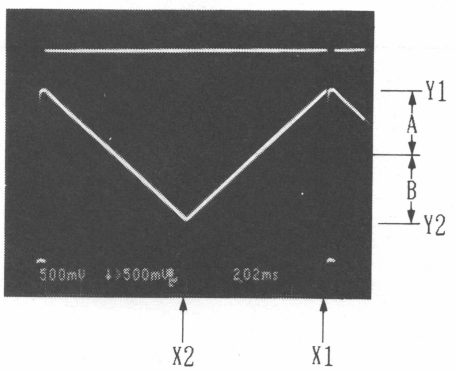
Machine conditions for adjustment	Measuring point and specification	Adjusting point
• Extend the board [WP-18 board] • Oscilloscope [DUAL MODE] • A-bus/B-bus line wipe [BDR] button [OFF] • B-bus line selection button [2] • [ROTARY] button [ON] • Wipe pattern selection button [◧] • A-bus/B-bus line fader [top position]	1. Perform the HD standard setting.	
	2. Perform the V position adjustment of oscilloscope.	
	3. Use the calibrated channel of the oscilloscope in step 2. TP12/WP-18 board (B9) Move the A-bus/B-bus fader levers between the top and bottom positions. NG  Fader lever:Top position  Fader lever:Bottom position  Difference between waveform cross-point of the V scale and the center of scale should be less than A=0±20mV.	⊘RV26/WP-18 board (B12) ⊘RV26/WP-18 board (C14) TRIG:HD:TP15/SG-115 board (C7) :TP14/SG-139 board (C6) GND:TP33/WP-18 board (A5)

Machine conditions for adjustment	Measuring point and specification	Adjusting point
・Wipe selection button [▬]	4. Perform the VD standard setting.	
	5. Perform the V position setting on the oscilloscope.	
	6. Use the calibrated channel of the oscilloscope in step 5. TP12/WP-18 board (B9) Move the A-bus/B-bus fader levers between the top and bottom positions. Fader lever:Top position  Fader lever:Bottom position  The difference between waveform cross-point of the V scale and the center of the scale should be less than A=0±20mV.	◓RV22/WP-18 board (B13) ◓RV16/WP-18 board (A14) TRIG:HD:TP3/SG-115 board (C7) :TP5/SG-139 board (C6) GND:TP33/WP-18 board (A5)

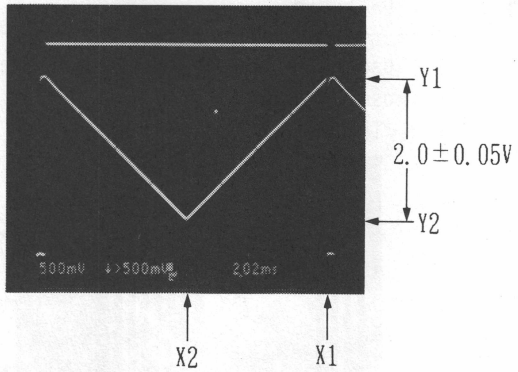
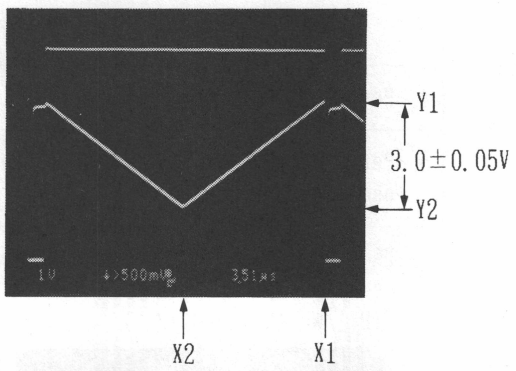
4-3-10. Rotary wipe-9 (◪) horizontal and vertical adjustments

Machine conditions for adjustment	Measuring point and specification	Adjusting point
• Extend the board [WP-18 board] • Oscilloscope [DUAL MODE] • Wipe pattern selection button [◪] • A-bus/B-bus line fader [bottom end position]	1. Perform the VD standard setting.	
	2. Perform the V position adjustment on the oscilloscope.	
	3. Use the calibrated channel of the oscilloscope in step 2. • TP11/WP-18 board (B12)  The hypotenuse of the waveform to be measured should cross the crossing point of the VD signal waveform and the oscilloscope H scale.	⊘RV24/WP-18 board (B13) TRIG:VD:TP3/SG-115 board (C7) :TP5/SG-139 board (C6) GND:TP33/WP-18 board (A5)
• A-bus/B-bus line fader lever [top position]	4. Perform the HD standard setting.	
	5. Perform the V position setting on the oscilloscope.	
	6. Use the calibrated channel of the oscilloscope in step 5. * TP10/WP-18 board (B12)  The hypotenuse of the waveform to be measured should cross the crossing point of the HD signal waveform and the oscilloscope H scale.	⊘RV23/WP-18 board (B13) TRIG:HD:TP15/SG-115 board (C7) TP14/SG-139 board (C6) GND:TP33/WP-18 board (A5)

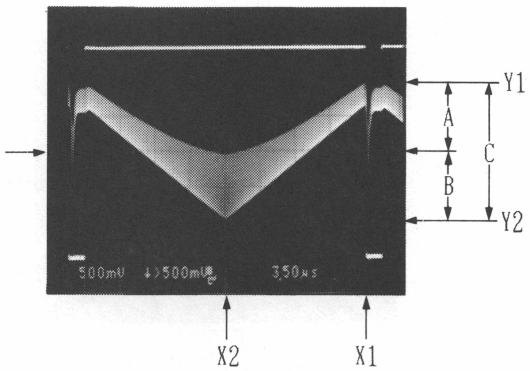
4-3-11. Cross pattern wipe horizontal and vertical adjustments

Machine conditions for adjustment	Measuring point and specification	Adjusting point
• Extend the board [WP-18 board] • Oscilloscope [DUAL MODE] • ROTARY button [OFF] • Wipe selection button [▪▪]	1. Perform the HD standard setting.	
	2. Perform the V position adjustment on the oscilloscope.	
	3. Use the calibrated channel of the oscilloscope in step 2. • TP10/WP-18 board (B12)  A-B=0±50mV	◐RV35/WP-18 board (B15) TRIG:VD:TP15/SG-115 board (C7) :TP4/SG-139 board (C6) GND:TP33/WP-18 board (A5)
	4. Perform the VD standard setting.	
	5. Perform the V position setting on the oscilloscope.	
	6. Use the calibrated channel of the oscilloscope in step 5. • TP11/WP-18 board (B12)  A-B=0±50mV	◐RV41/WP-18 board (B16) TRIG:VD:TP3/SG-115 board (C7) :TP5/SG-139 board (C6) GND:TP33/WP-18 board (A5)

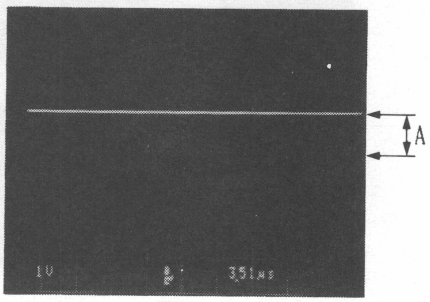
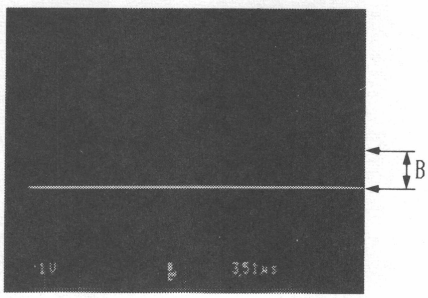
4-3-12. Circle wipe triangle horizontal and vertical adjustments

Machine conditions for adjustment	Measuring point and specification	Adjusting point
• Extend the board [WP-18 board] • Oscilloscope [DUAL MODE] • Wipe pattern selection button [●]	1. Perform the VD standard setting.	
	2. TP4/WP-18 board (A16)  	◐RV38/WP-18 board (A16) TRIG:VD:TP3/SG-115 board (C7) TP5/SG-139 board (C6) GND:TP33/WP-18 board (A5)
	3. Perform the HD standard setting.	
	4. TP3/WP-18 board (B14)  	◐RV34/WP-18 board (B15) TRIG:HD:TP15/SG-115 board (C7) :TP14/SG-139 board (C6) GND:TP33/WP-18 board (A5)

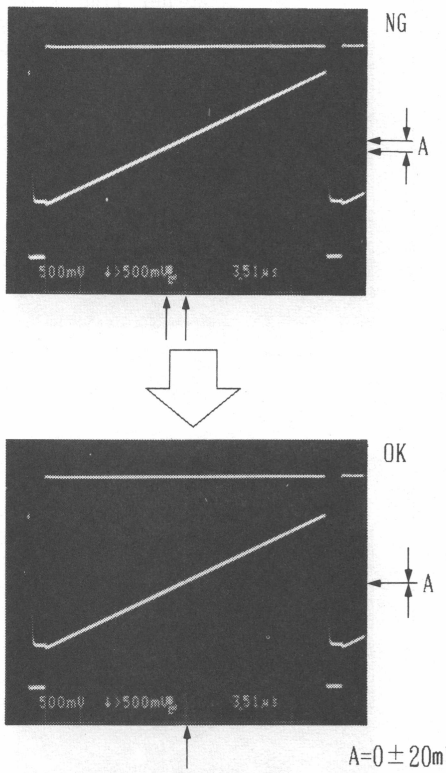
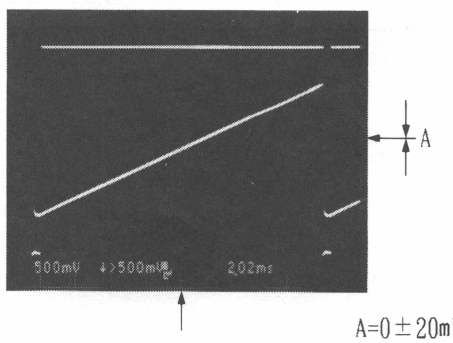
4-3-13. Circle wipe adjustment

Machine conditions for adjustment	Measuring point and specification	Adjusting point
・Extend the board [WP-18 board] ・Oscilloscope [DUAL MODE]	1. Perform the HD standard setting.	
	2. Perform the V position setting on the oscilloscope.	
	3. Use the calibrated channel of the oscilloscope in step 2. ・TP7/WP-18 board (A14)  A-B=0±50mV C=1.9±0.1V	A-B:⊘RV42/WP-18 board (A13) C:⊘RV25/WP-18 board (A13) TRIG:HD:TP15/SG-115 board (C7) GND:TP33/WP-18 board(A5)

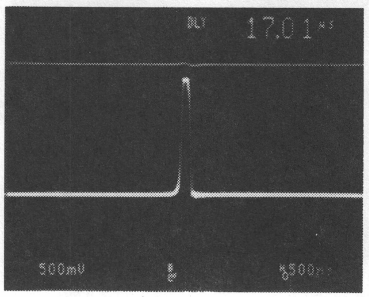
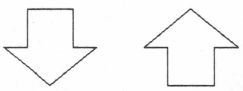
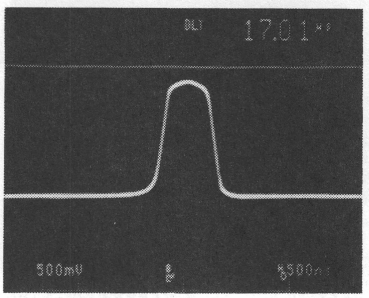
4-3-14. Reference voltage adjustment

Machine conditions for adjustment	Measuring point and specification	Adjusting point
• Extend the board [WP-18 board] • Oscilloscope [NORMAL MODE] • PGM/PST line [WIPE] button [ON] • Wipe pattern selection [■] • PGM/PST line fader lever [top position]	1. Perform the vertical position setting on the oscilloscope.	
	2. TP22/WP-18 board (B1) Move the PGM/PST line fader lever up and down. Move the PGM/PST line fader lever: Top position.  A-B=0±20mV Move the PGM/PST line fader lever: Bottom position.  	◐RV5/WP-18 board (B2) GND:TP33/WP-18 board (A5)

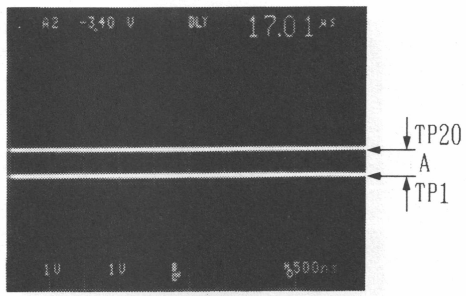
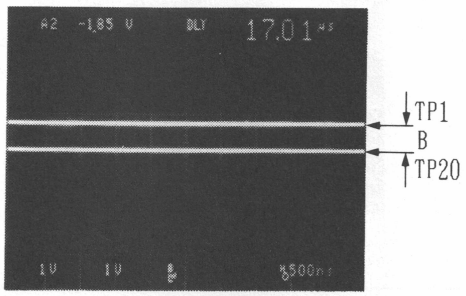
4-3-15. Horizontal and vertical ramp DC level adjustment

Machine conditions for adjustment	Measuring point and specification	Adjusting point
• Extend the board [WP-18 board] • Oscilloscope [NORMAL MODE] • PGM/PST line fader lever [bottom position]	1. Perform the HD standard setting.	
	2. Perform the V position setting on the oscilloscope.	
	3. TP28/WP-18 board (A1)  A=0±20mV	◐RV2/WP-18 board (A1) TRIG:HD:TP15/SG-115 board (C7) :TP14/SG-139 board (C6) GND:TP33/WP-18 board (A5)
	4. Perform the VD standard setting.	
	5. Perform the vertical position setting on the oscilloscope.	
	6. TP21/WP-18 board (A2)  A=0±20mV	◐RV3/WP-18 board (A2) TRIG:VD:TP3/SG-115 board (C7) :TP5/SG-139 board (C6) GND:TP33/WP-18 board

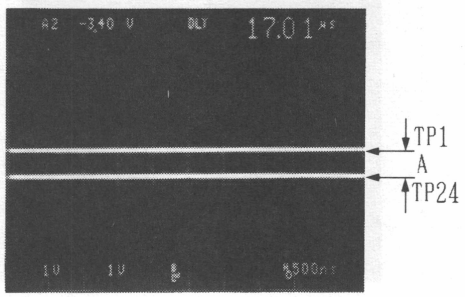
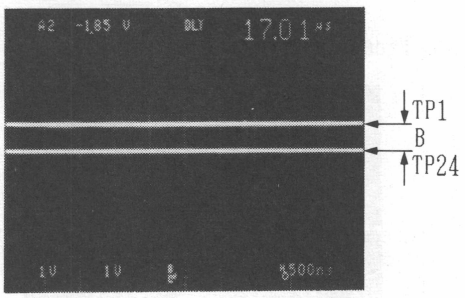
4-3-16. PGM/PST line border line center adjustment

Machine conditions for adjustment	Measuring point and specification	Adjusting point
• Extend the board [WP-18 board] • Oscilloscope [NORMAL MODE] • PGM/PST line wipe [BDR] [NORMAL MODE] • PGM/PST line fader lever [mechanical center position]	• TP26/WP-18 board (A4) Increase and decrease the width of the border line from maximum to minimum levels using the PGM/PST line soft/border amount setting button. Border line width: Minimum   Border line width: Maximum  The center of the waveform should shift as little as possible during transition between the maximum and minimum positions.	⊘RV1/WP-18 board (A1) TRIG:HD:TP15/SG-115 board (C7) :TP14/SG-139 board (C6) GND:TP33/WP-18 board (A5)

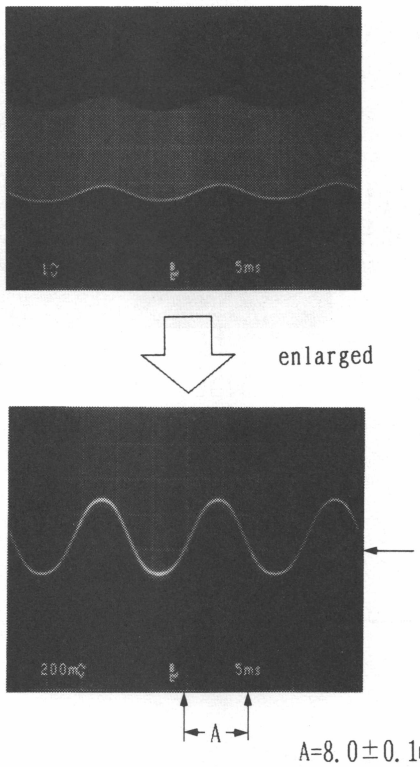
4-3-17. A-bus/B-bus line control voltage adjustment

Machine conditions for adjustment	Measuring point and specification	Adjusting point
• Extend the board [WP-18 board] • Oscilloscope [DUAL MODE] • PGM/PST line wipe [BDR] button [OFF] A-bus/B-bus line [MIX] button [ON] • A-bus/B-bus line fader lever [bottom position]	• Calibrate the ground level of all oscilloscope channels to the same level. • TP1/extension board • TP20/WP-18 board (B6) Fader lever: Bottom position  A-B=0±20mV Fader lever: Top position  	◐RV12/WP-18 board (B16) GND:TP33/WP-18 board (A5)

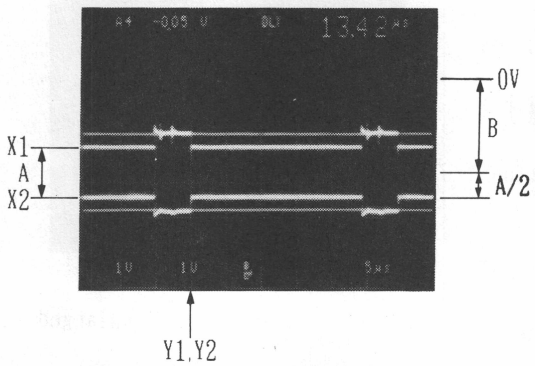
4-3-18. PGM/PST line control voltage adjustment

Machine conditions for adjustment	Measuring point and specification	Adjusting point
• Extend the board [WP-18 board] • Oscilloscope [DUAL MODE] • PGM/PST line [MIX] button [ON] • A-bus/B-bus line fader lever [top position] • PGM/PST line fader lever [bottom position]	• TP1/extension board • TP24/WP-18 board (C7) Move the PGM/PST line fader lever up and down. Fader lever:Bottom position  Fader lever:Top position  A-B=0±20mV	⊘RV6/WP-18 board (B3) GND:TP33/WP-18 board (A5)

4-3-19. Modulation adjustment

Machine conditions for adjustment	Measuring point and specification	Adjusting point
• Extend the board [WP-18 board] • Oscilloscope [AC NORMAL MODE] • PGM/PST line fader lever [top position] • A-bus/B-bus line [WIPE] button [ON] • Wipe selection button [◧] • Wipe [MOD] button [ON] • Wipe modulation [LOCK] button [ON] • AMP control potentiometer [↻ fully clockwise position] • FRQ control potentiometer [↺ fully counterclockwise position] • A-bus/B-bus fader lever [mechanical center position]	• TP12/WP-18 board (B9)  A=8.0±0.1ms	◐RV17/WP-18 board (B10) TRIG:VD:TP3/SG-115 board (C7) TP5/SG-139 board (C6) GND:TP33/WP-18 board (A5)

4-3-20. KEY DC balance adjustment

Machine conditions for adjustment	Measuring point and specification	Adjusting point
• Extension board [WP-18 board] • Oscilloscope [DUAL MODE] • Wipe [MOD] button [OFF] • Wipe modulation [LOCK] button [OFF] • A-bus/B-bus fader lever [top position] • A-bus/B-bus [MIX] button [ON] • A-bus/B-bus [KEY] button [OFF]	• IC23 pin 1/WP-18 board (A6) • IC23 pin 3/WP-18 board (A6)  A=1.5±0.05V B=2.5±0.1V	A:⊘RV9/WP-18 board (A5) B:⊘RV101/WP-18 board (A5) TRIG:HD:TP15/SG-115 board (C7) :TP14/SG-139 board (C6) GND:TP33/WP-18 board (C7)

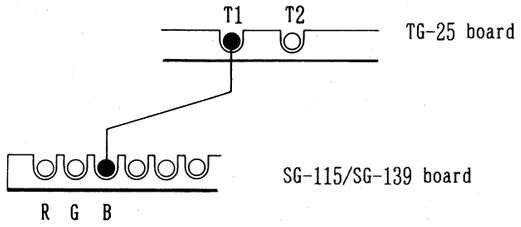
4-4. TG-25 Board Adjustment

[Description of adjustment]
This section provides the adjustment procedure for the TG-25 board by using the B. OUT signal from SG-115 board CN8 and SG-139 board CN7 as the TITLE signal that is input to the TG-25 board CN1 (T1 IN).

[Equipment Required]
- Oscilloscope (dual track, more than 100MHZ)
- Digital voltmeter

[Cables and components required]
- Extension board EX-118
- RF connector cable (Sony parts No. : 1-938-283-21)

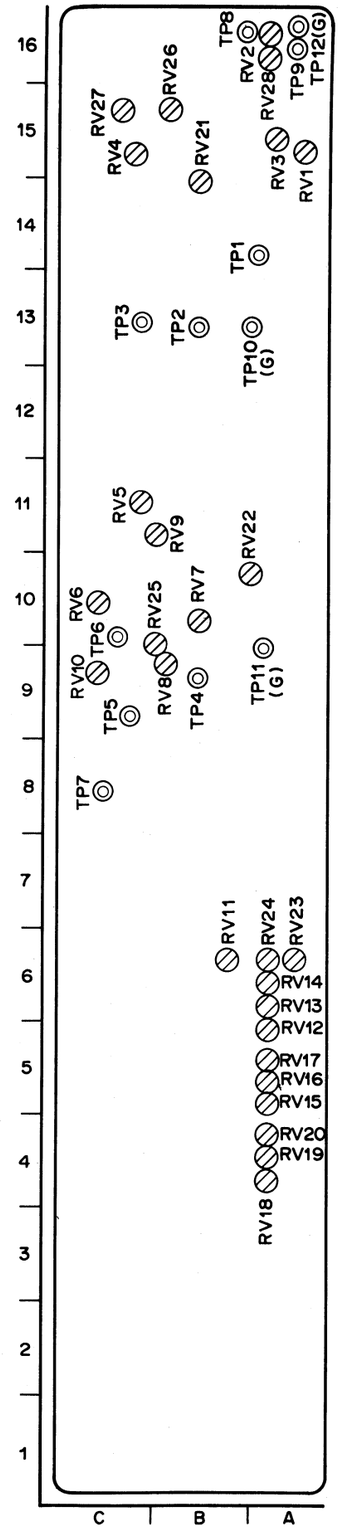
[Preparation]
- Remove the shield plate that covers half of the TG-25 board for adjustment.
- Connect the SG-115 board CN8 and SG-139 CN7 (B. OUT) to the TG-25 board CN1 (T1 IN) with the RF connector cable that has already been installed at the factory.



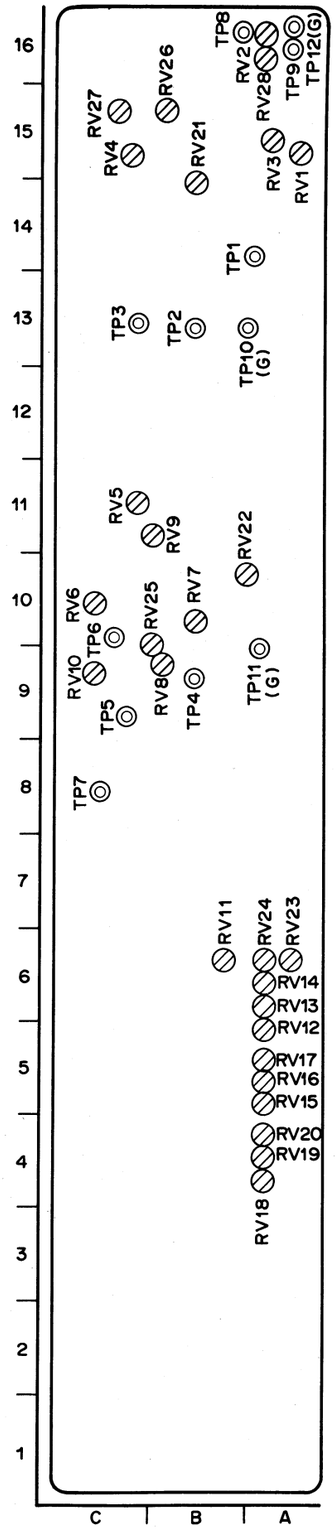
- Put the operation panel into its pre-set condition.

4-4-1. Area sensor adjustment

Machine conditions for adjustment	Measuring point and specification	Adjusting point
• Extend the board [TG-25 board] • Digital voltmeter [DC MODE]	• IC6 pin 1/TG-25 board (A10) 0.85±0.01V	◐RV22/TG-25 board (A10) GND:TP11/TG-25 board(A10)

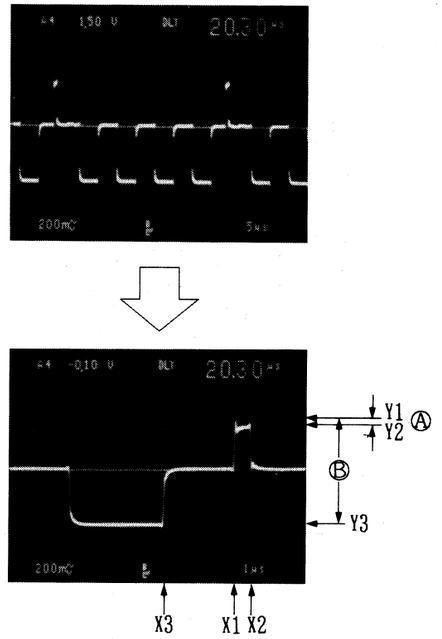


TG-25
COMPONENT SIDE



TG-25
COMPONENT SIDE

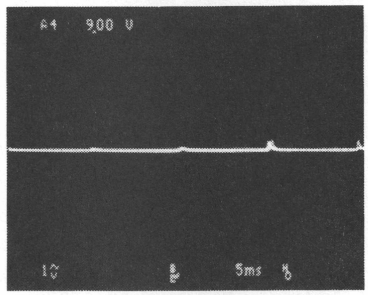
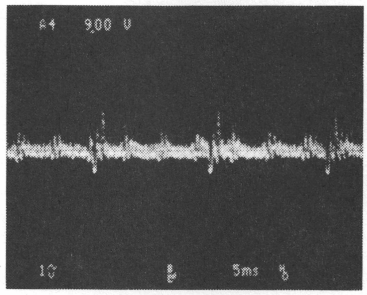
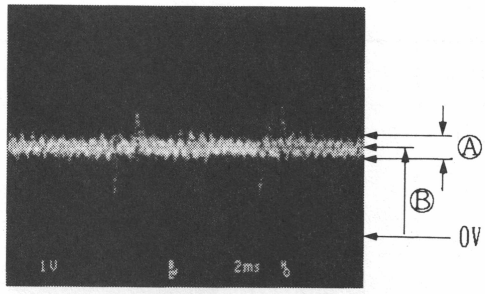
4-4-2. 1H delayed signal DC adjustment

Machine conditions for adjustment	Measuring point and specification	Adjusting point
・Extend the board [TG-25 board] ・Oscilloscope [AC MODE]	TP2/TG-25 board (B13)  Maximize portion Ⓐ in the figure. Then, maximize portion Ⓑ, while taking care not to dull the waveform.	◕RV21/TG-25 board (B15) ◕RV26/TG-25 board (B15) ◕RV27/TG-25 board (C15) TRIG:HD:TP15/SG-115 board (C7) :TP14/SG-139 board (C6) GND:TP11/TG-25 board (A10)

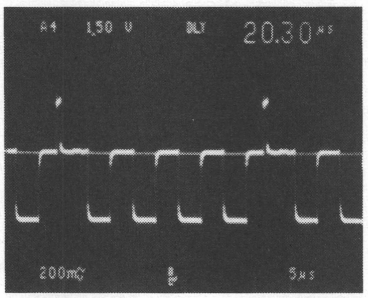
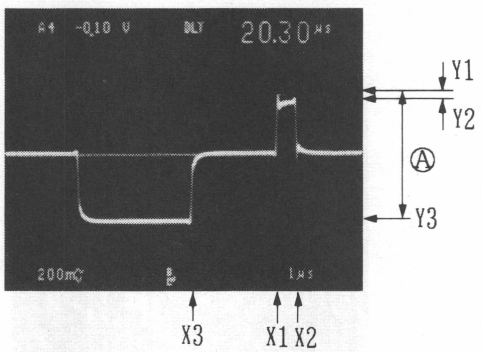
4-4-3. Sync separator adjustment

Machine conditions for adjustment	Measuring point and specification	Adjusting point
・Extend the board [TG-25 board] ・Digital voltmeter [DC MODE]	・IC8 pin 2/TG-25 board (A15) -0.2±0.01V	◕RV3/TG-25 board (A15) GND:TP11/TG-25 board (A10)

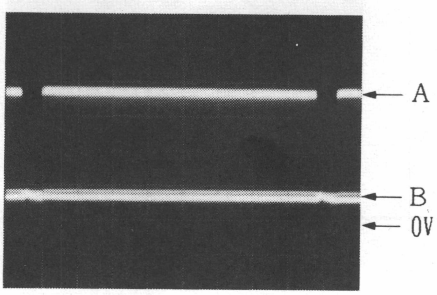
4-4-4. Clock pulse PLL adjustment

Machine conditions for adjustment	Measuring point and specification	Adjusting point
• Extend the board [TG-25 board] • Oscilloscope [AC MODE]	1. Turn RV2 on the TG-25 board (A16) fully counterclockwise. • TP9/TG-25 board (A16)  NG  OK Note: If this waveform becomes rectangular, try adjusting RV28 on the TG-25 board (A16) slightly.	⊘RV1/TG-25 board (A15) TRIG:VD:TP3/SG-115 board (C7) :TP5/SG-139 board (C6) GND:TP11/TG-25 board (A10)
• Oscilloscope [NORMAL MODE]	2. TP9/TG-25 board (A16)  A=1.0±0.2V B=2.5±0.1V	A:⊘RV2/TG-25 board (C7) B:⊘RV28/TG-25 board (A16) TRIG:VD:TP3/SG-115 board (C7) :TP5/SG-139 board (C6) GND:TP11/TG-25 board (A10)

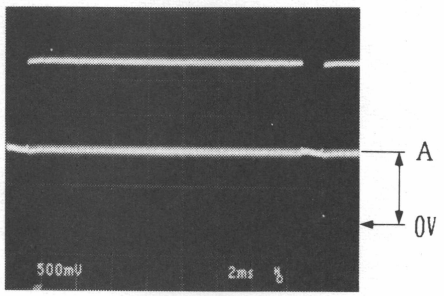
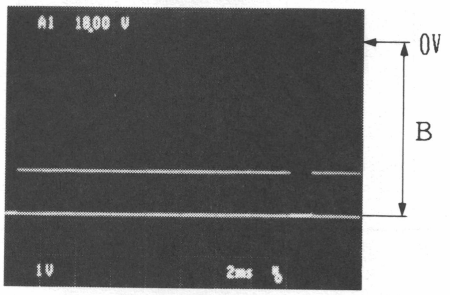
4-4-5. 2H delayed signal DC adjustment

Machine conditions for adjustment	Measuring point and specification	Adjusting point
・Extend the board [TG-25 board] ・Oscilloscope [AC MODE]	・TP3/TG-25 board (C13)  enlarged  Maximize portion Ⓐ while taking care not to dull the waveform.	⊘RV4/TG-25 board (C15) TRIG:VD:TP3/SG-115 board (C7) :TP5/SG-139 board (C6) GND:TP11/TG-25 board(A10)

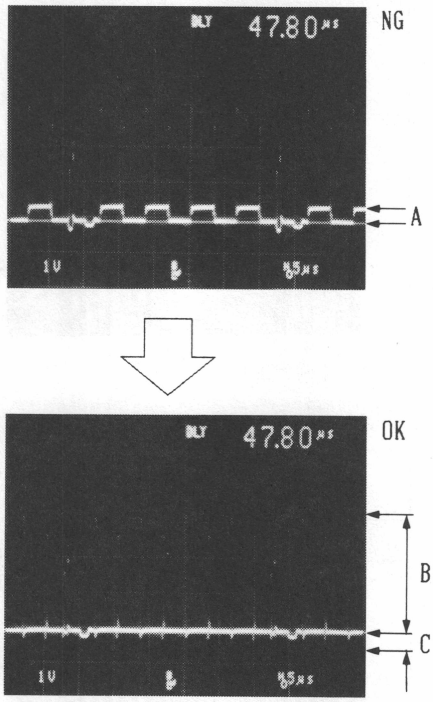
4-4-6. KEY signal adjustment

Machine conditions for adjustment	Measuring point and specification	Adjusting point
・Extend the board [TG-25 board] ・Oscilloscope [NORMAL MODE]	・TP4/TG-25 board (B9)  A=0.4±0.04V B=2.3±0.1V	A:⊘RV7/TG-25 board (B10) B:⊘RV8/TG-25 board (B9) TRIG:VD:TP3/SG-115 board (C7) :TP5/SG-139 board (C6) GND:TP11/TG-25 board(A10)

4-4-7. Key video signal adjustment

Machine conditions for adjustment	Measuring point and specification	Adjusting point
・Extene the board [TG-25 board] ・Oscilloscope [NORMAL MODE]	1. TP6/TG-25 board (C10)  A=1.0±0.05V	◐RV6/TG-25 board (C10) TRIG:VD:TP3/SG-115 board (C7) :TP5/SG-139 board (C6) GND:TP11/TG-25 board (A10)
	2. Lead wire of C54 where the lead wire is connected to RV9 on the TG-25 board (C10)  B=-5.0±0.5V	◐RV3/TG-25 board (C11) TRIG:VD:TP3/SG-115 board (C7) :TP5/SG-139 board (C6) GND:TP11/TG-25 board (A10)

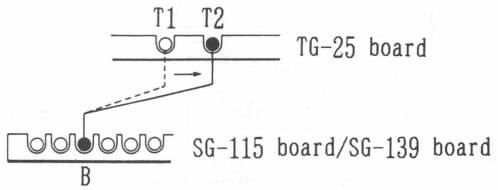
4-4-8. Border signal adjustment

Machine conditions for adjustment	Measuring point and specification	Adjusting point
• Extend the board [TG-25 board] • Oscilloscope [NORMAL MODE]	1. TP5/TG-25 board (C9)  A=0±0.05V B=3.0±0.3V C=0.4±0.04V	A:RV9/TG-25 board (C11) B:RV25/TG-25 board (C10) C:RV10/TG-25 board (C9) TRIG:VD:TP3/SG-115 board (C7) :TP5/SG-139 board (C6) GND:TP11/TG-25 board (A10)

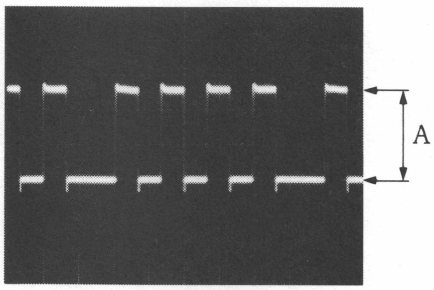
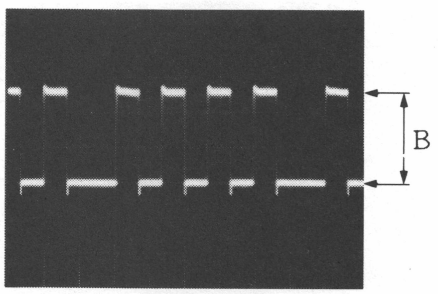
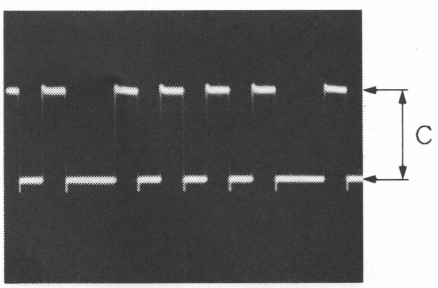
4-4-9. Title control voltage adjustment

Machine conditions for adjustment	Measuring point and specification	Adjusting point
• Extene the board [TG-25 board] • Digital voltmeter [DC MODE] • PGM line selection button [EFF] • PST line selection button [EFF] • TITLE1 button [ON]	1. IC11 pin 1/TG-25 board (A7) 2.6±0.05V	RV23/TG-25 board (A6) GND:TP11/TG-25 board (A10)
• TITLE1 button [OFF] • TITLE2 button [ON]	2. IC11 pin 7/TG-25 board (A7) 2.7±0.05V	RV24/TG-25 board (A6) GND:TP11/TG-25 board (A10)

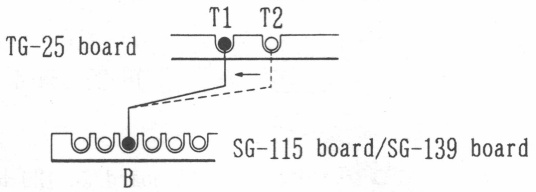
[Setting Alteration]
Remove the Blue signal input that is supplied from the SG-115 board/SG-139 board to the TG-25 board CN1 (T1 IN). Connect this Blue signal to the TG-25 board CN2 (T2 IN).



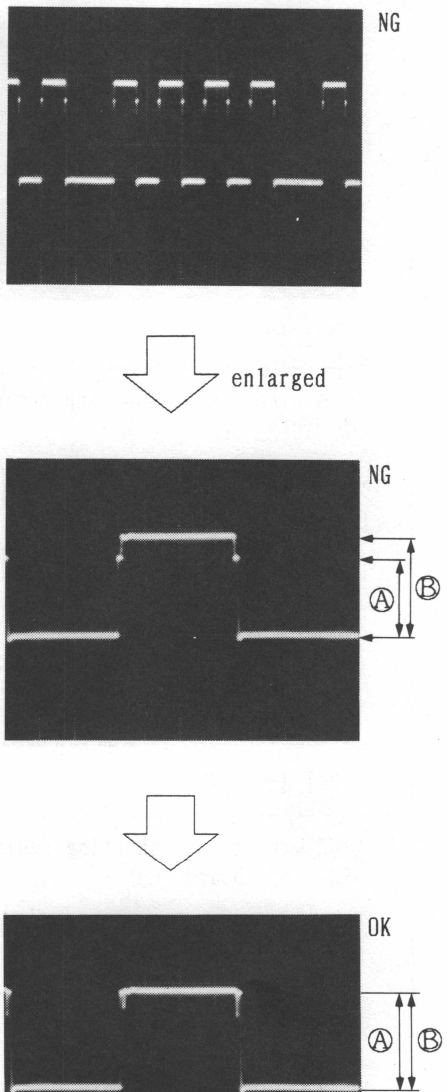
4-4-10. T2 color control voltage

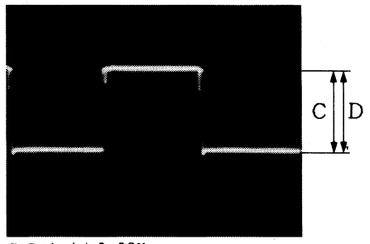
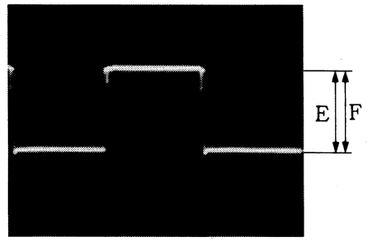
Machine conditions for adjustment	Measuring point and specification	Adjusting point
• Extend the board [TG-25 board] • Oscilloscope [AC MODE] • TITLE COLOR 1: SAT control[Q fully clockwise] LUM control[Q fully clockwise] • TITLE COLOR 2: SAT control[Q fully clockwise] LUM control[Q fully clockwise] HUE control[Q fully clockwise] • [TITLE 2] button [ON]	1. Lead wire leg of shorting resistor JR1/TG-25 board (C2)  A=1.4±0.02V	⊘RV12/TG-25 board (A5) TRIG:HD:TP15/SG-115 board (C7) :TP14/SG-139 board (C6) GND:TP11/TG-25 board(A10)
	2. Lead wire leg of shorting resistor JR2/TG-25 board (C4)  B=1.4±0.02V	⊘RV13/TG-25 board (A6) TRIG:HD:TP15/SG-115 board (C7) :TP14/SG-139 board (C6) ⊘:TP11/TG-25 board (A10)
	3. Lead wire leg of shorting resistor JR3/TG-25 board (C5)  C=1.4±0.02V	⊘RV14/TG-25 board (A6) TRIG:HD:TP15/SG-115 board (C7) :TP14/SG-139 board (C6) GND:TP11/TG-25 board (A10)

[Setting alteration]
Remove the Blue signal input that is supplied from the SG-115 board/SG-139 board to the TG-25 board CN2 (T2 IN). Connect this Blue signal to the TG-25 board CN1 (T1 IN).

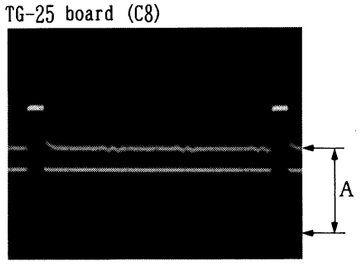


4-4-11. T1 color control voltage

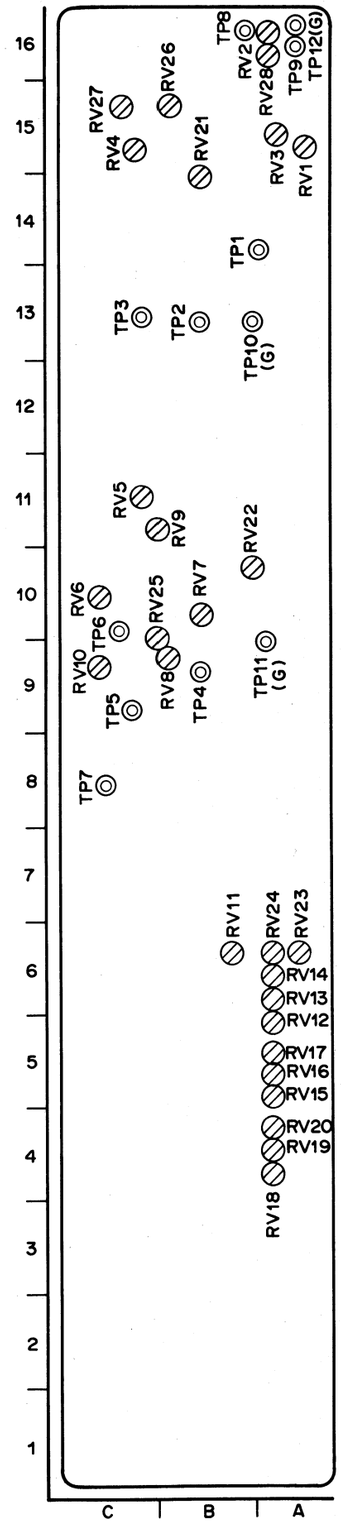
Machine conditions for adjustment	Measuring point and specification	Adjusting point
• Extend the board [TG-25 board] • Oscilloscope [AC MODE] • TITLE COLOR 1: HUE control[↻ fully clockwise] • TITLE 1 button [ON]	1. Lead wire leg of shorting resistor JR4/TG-25 board (B2)  A=B=1.4±0.02V	A:⊘RV15/TG-25 board (A5) B:⊘RV18/TG-25 board (A4) TRIG:HD:TP15/SG-115 board (C7) :TP14/SG-19 board (C6) GND:TP11/TG-25 board (A10)

Machine conditions for adjustment	Measuring point and specification	Adjusting point
	2. Lead wire portion of shorting resistor JR5/TG-25 board (B2)  C=D=1.4±0.02V	C:⊘RV16/TG-25 board (A5) D:⊘RV19/TG-25 board (A4) TRIG:HD:TP15/SG-115 board (C7) :TP14/SG-139 board (C6) GND:TP11/TG-25 board (A10)
	3. Lead wire portion of shorting resistor JR6/TG-25 board (B2)  B=F=1.4±0.02V	B:⊘RV17/TG-25 board (A5) F:⊘RV20/TG-25 board (A4) TRIG:HD:TP15/SG-115 board (C7) :TP14/SG-139 board (C6) GND:TP11/TG-25 board (A10)

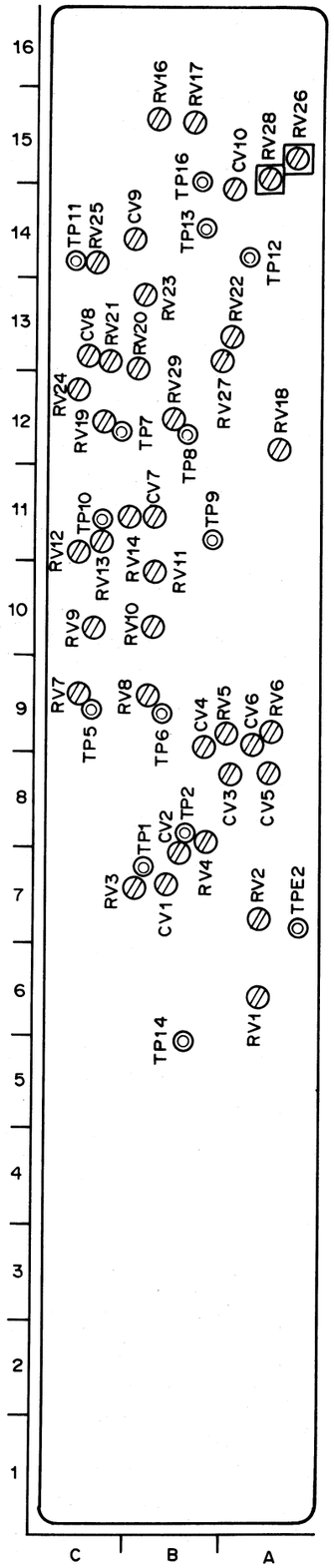
4-4-12. Key inversion signal adjustment

Machine conditions for adjustment	Measuring point and specification	Adjusting point
・Extension board [TG-25 board] ・Oscilloscope [NORMAL MODE]	・Lead wire portion of resistor R108 on the TG-25 board (C8)  A=2.8±0.01V	⊘RV11/TG-25 board (B6) TRIG:VD:TP3/SG-115 board (C7) :TP5/SG-139 board (C7) GND:TP11/TG-25 board (A10)

[Setting after the adjustment]
・Return the RF connectors to their original connections.



TG-25
COMPONENT SIDE



EF – 16
COMPONENT SIDE

4-5. EF-16 Board Adjustment

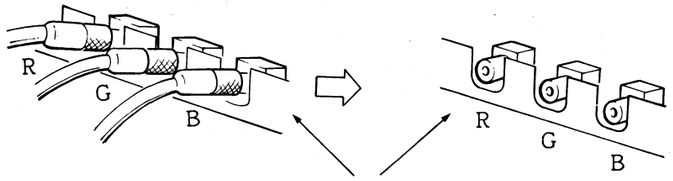
[Description of adjustment]
This section provides the EF-16 board gain, frequency response and other adjustments by measuring the input and output signals of the EF-16 board by comparing and removing the difference between these two signals. SG-115 board/SG-139 board is used during this adjustment as the signal source for the gain adjustment.

[Caution]
- Three EF-16 boards for R, G, and B are used in this equipment. Adjust all three EF-16 boards.
- When the oscilloscope is used in "DUAL MODE", it is important that both channels have the same characteristics.
- When observing waveforms on the oscilloscope, make the beam as thin as possible to reduce measuring error as much as possible.
- The pictures shown in this adjustment procedure are from the HDS-1000. When the HDS-1000T is used, adjusting procedure remains the same though the waveforms may differ slightly.

[Equipment required]
- Oscilloscope (Dual trace, more than 100MHz)
- Video signal generator (Shiba Soku: VS13A0 or equivalent)
- Pulse generator (YHP: 8012B or equivalent)

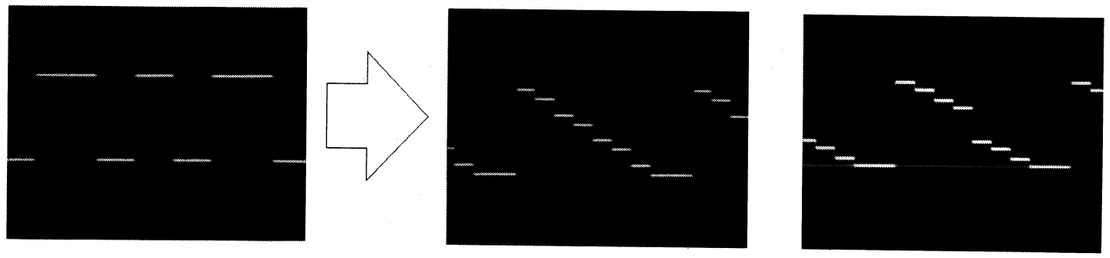
[Cables and components required]
- Extension board EX-118
- RF connector cable (Sony parts No. : 1-938-283-21) : two pieces
- BNC connector cable (Sony parats No. : 1-938-290-31) : two pieces

[Preparation]
- Remove all RF connectors that are connected to the SG-115 board/SG-139 board and to the EF-16 board.



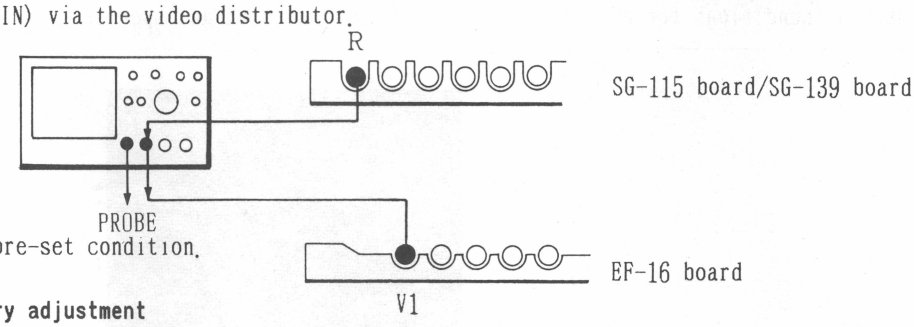
SG-115 board/SG-139 board

- Change the connection of the SG-115 board JR11 to JR12.
- Change the connection of the SG-139 board shorting socket SH1 to SH2.



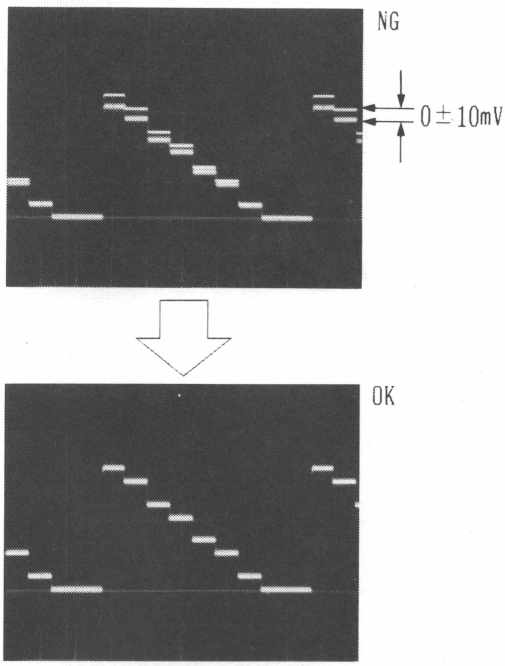
1. JR11 shorting connection CN6 (R OUT)/SH1 shorting connection CN5 (R OUT)
2. JR12 shorting connection CN6 (R OUT)
3. SH2 shorting connection CN5 (R OUT)

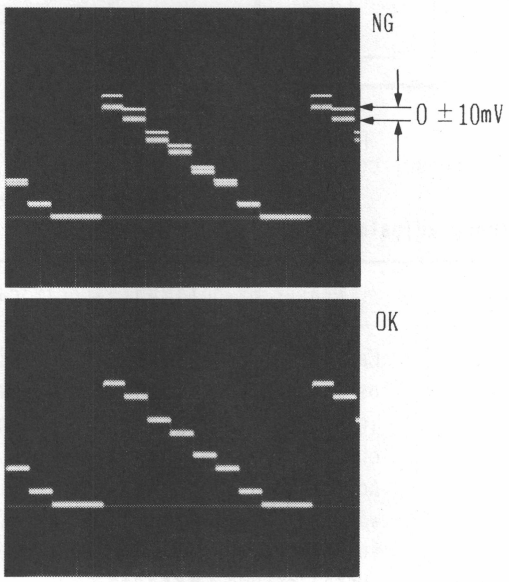
・Connect the output signal of the SG-115 board's CN6/SG-139 board's CN5 (R OUT) to the oscilloscope CH-2 input and the EF-16 board CN1 (V1 IN) via the video distributor.



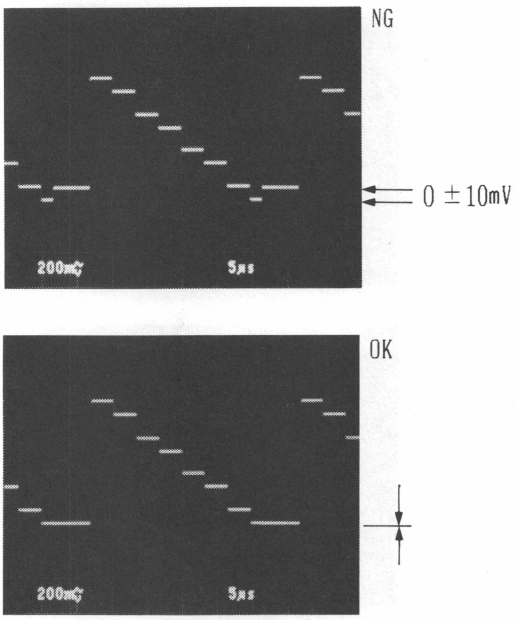
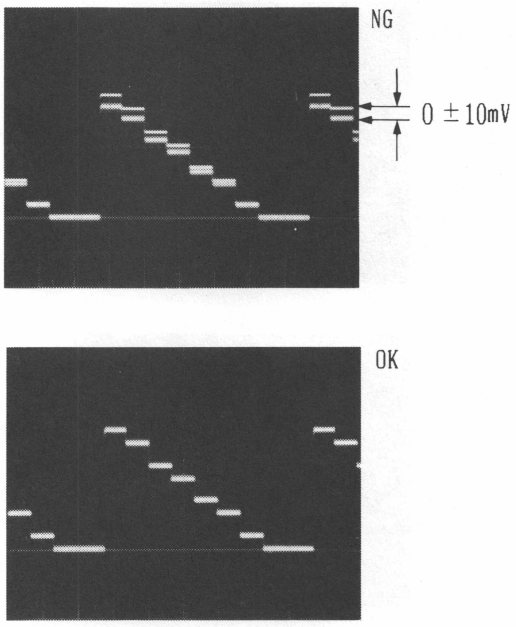
・Put the control panel into its pre-set condition.

4-5-1. A-bus/B-bus gain preliminary adjustment

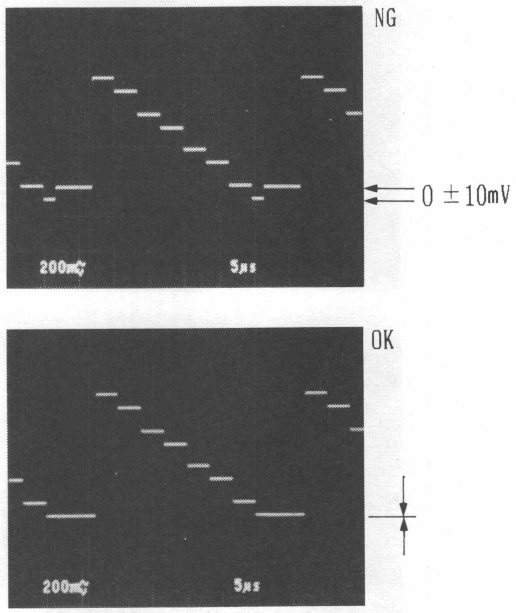
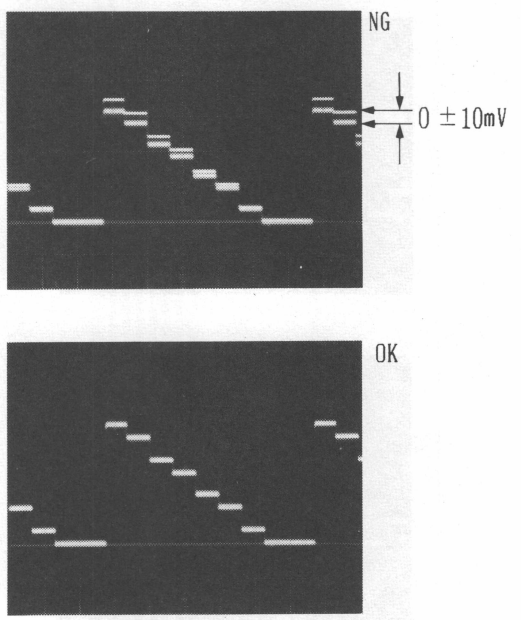
Machine conditions for adjustment	Measuring point and specification	Adjusting point
・Extend the board [EF-16 board] ・Oscilloscope [DUAL MODE]	1. Calibrate the ground level of all oscilloscope channels to the same ground level and also calibrate all scope channels to the same range. Adjust the potentiometer until the waveform amplitude difference of the following two waveforms becomes 0±10mV. ・Oscilloscope CH-2 ・TP1/EF-16 board (B7)  	◐RV3/EF-16 board (B7) TRIG:HD:TP15/SG-115 board (C7) :TP14/SG-139 board (C6) GND:TPE2/EF-16 board (A7)
・A-bus/B-bus line fader lever [bottom position]	2. Calibrate the ground level of all oscilloscope channels to the same ground level and also calibrate all scope channels to the same range. Adjust the potentiometer until waveform amplitude difference of the following two waveforms becomes 0±10mV. ・Oscilloscope CH-2 ・TP2/EF-16 board (B8)	◐RV4/EF-16 board (B8)

Machine conditions for adjustment	Measuring point and specification	Adjusting point
		TRIG:HD:TP15/SG-115 board (C7) :TP14/SG-139 board (C6) GND:TPE2/EF-16 board (A7)

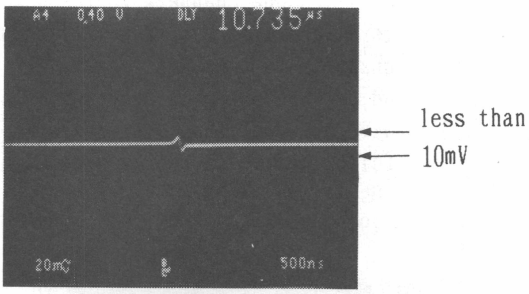
4-5-2. A-bus pedestal level and gain adjustment

Machine conditions for adjustment	Measuring point and specification	Adjusting point
• Extend the board [EF-16 board] • Oscilloscope [AC MODE] • A-bus/B-bus fader lever [top position] • A-bus/B-bus [WIPE] button [ON]	1. TP9/EF-16 board (B11) 	◐RV7/EF-16 board (C9) TRIG:HD:TP15/SG-115 board (C7) :TP14/SG-139 board (C6) GND:TPE2/EF-16 board (A7)
• Oscilloscope [DUAL MODE]	2. Calibrate the ground level of all oscilloscope channels to the same ground level and also calibrate all scope channels to the same range. Adjust the potentiometer until the waveform amplitude difference of the following two waveforms becomes 0±10mV. • Oscilloscope CH-2 • TP9/EF-16 board (B11) 	◐RV9/EF-16 board (C10) TRIG:HD:TP15/SG-115 board (C7) :TP14/SG-139 board (C6) GND:TPE2/EF-16 board (A7)

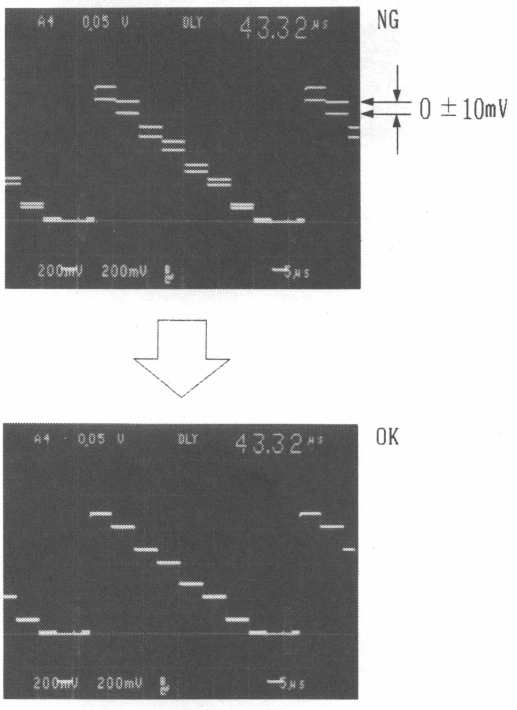
4-5-3. B-bus pedestal level and gain adjustment

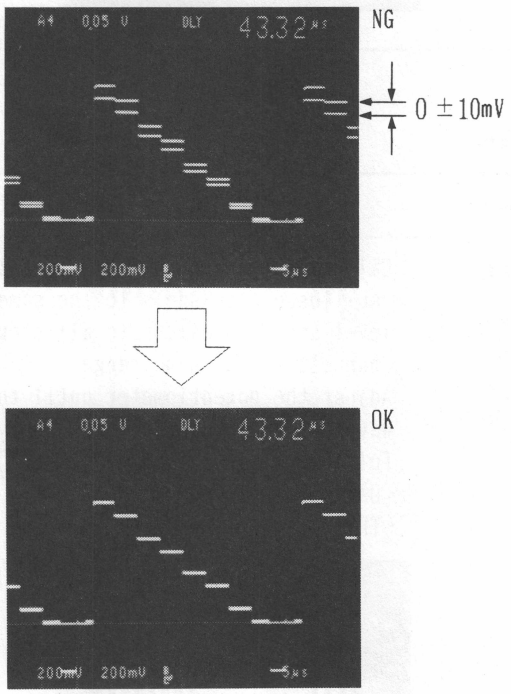
Machine conditions for adjustment	Measuring point and specification	Adjusting point
• Extend the board [EF-16 board] • Oscilloscope [AC MODE]	1. TP9/EF-16 board (B11)  	◐RV8/EF-16 board (B9) TRIG:HD:TP15/SG-115 board (C7) :TP14/SG-139 board (C6) GND:TPE2/EF-16 board (A7)
• Oscilloscope [DUAL MODE] • A-bus/B-bus fader lever [bottom position]	2. Calibrate the ground level of all oscilloscope channels to the same ground level and also calibrate all scope channels to the same range. Adjust the potentiometer until the waveform amplitude difference of the following two waveforms becomes 0±10mV. • Oscilloscope CH-2 • TP9/EF-16 board (B11)  	◐RV10/EF-16 board (B10) TRIG:HD:TP15/SG-115 board (C7) :TP14/SG-139 board (C6) GND:TPE2/EF-16 board (A7)

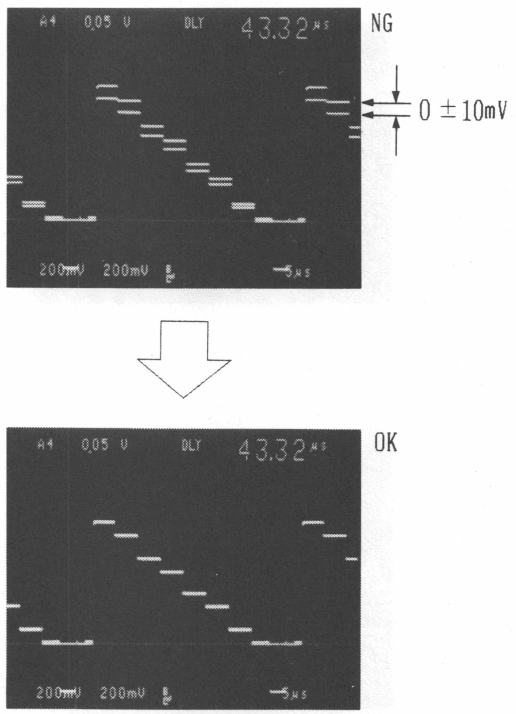
4-5-4. A-bus/B-bus wipe shape-scar adjustment

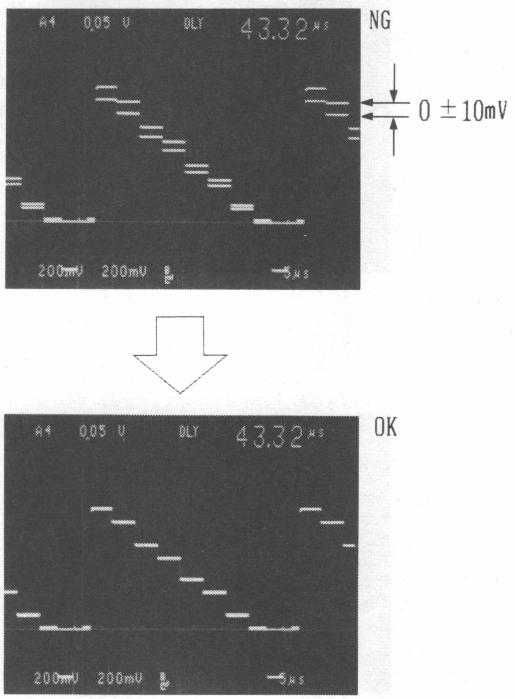
Machine conditions for adjustment	Measuring point and specification	Adjusting point
• Extend the board [EF-16 board] • Oscilloscope [NORMAL MODE] • A-bus line select button [3] • B-bus line select button [3] • A-bus/B-bus fader lever [mechanical center position]	1. TP9/EF-16 board (B11)  	◐RV12/EF-16 board (C11) TRIG:HD:TP15/SG-115 board (C7) :TP14/SG-139 board (C6) GND:TPE2/EF-16 board (A7)

4-5-5. PGM/PST line gain adjustment

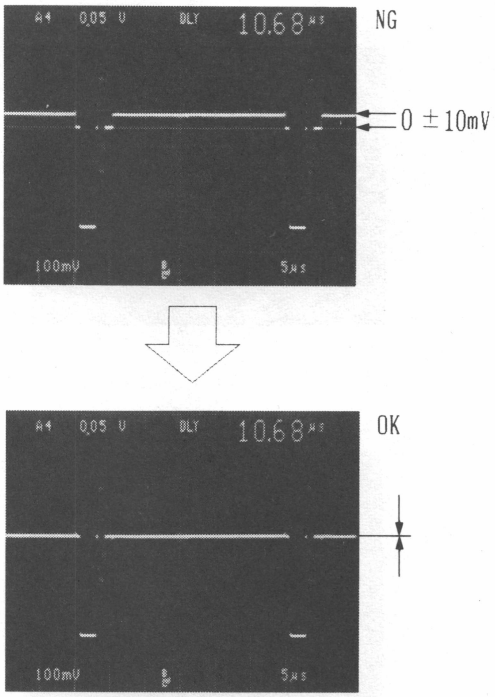
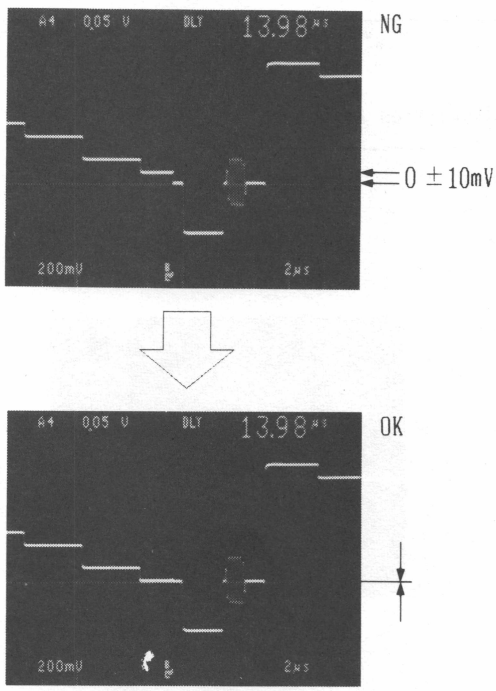
Machine conditions for adjustment	Measuring point and specification	Adjusting point
• Extend the board [EF-16 board] • Oscilloscope [DUAL MODE] • A-bus line select button [1] • B-bus line select button [1] • PGM line select button [EFF] • PST line select button [EFF]	1. Calibrate the ground level of all oscilloscope channels to the same ground level and also calibrate all scope channels to the same range. Adjust the potentiometer until the waveform amplitude difference of the following two waveforms becomes 0±10mV. • Oscilloscope CH-2 • TP12/EF-16 board (A14)  	◐RV21/EF-16 board (C13) TRIG:HD:TP15/SG-115 board (C7) :TP14/SG-139 board (C6) GND:TPE2/EF-16 board (A7)

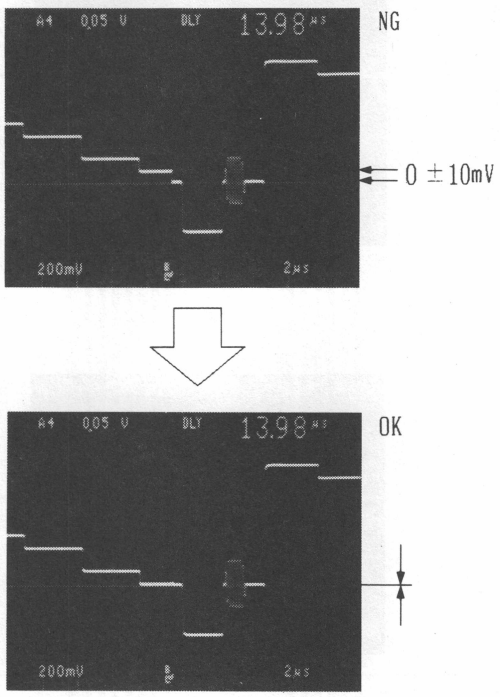
Machine conditions for adjustment	Measuring point and specification	Adjusting point
• PGM/PST line fader lever [bottom position]	2. Calibrate the ground level of all oscilloscope channels to the same ground level and also calibrate all scope channels to the same range. Adjust the potentiometer until the waveform amplitude difference of the following two waveforms becomes 0±10mV. • Oscilloscope CH-2 • TP12/EF-16 board (A14) 	◐RV20/EF-16 board (B13) TRIG:HD:TP15/SG-115 board (C7) :TP14/SG-139 board (C6) GND:TPE2/EF-16 board (A7)

Machine conditions for adjustment	Measuring point and specification	Adjusting point
• PGM line select button [1] • PST line select button [1] • PGM/PST line fader lever [top position]	3. Calibrate the ground level of all oscilloscope channels to the same ground level and also calibrate all scope channels to the same range. Adjust the potentiometer until the waveform amplitude difference of the following two waveforms becomes 0±10mV. • Oscilloscope CH-2 • TP12/EF-16 board (A14) 	◐RV5/EF-16 board (A9) TRIG:HD:TP15/SG-115 board (C7) :TP14/SG-139 board (C6) GND:TPE2/EF-16 board (A7)

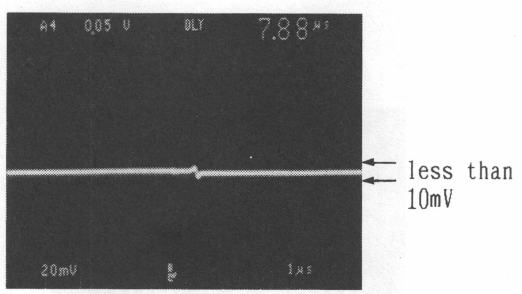
Machine conditions for adjustment	Measuring point and specification	Adjusting point
・PGM/PST line fader lever [bottom position]	4. Calibrate the ground level of all oscilloscope channels to the same ground level and also calibrate all scope channels to the same range. Adjust the potentiometer until the waveform amplitude difference of the following two waveforms becomes 0±10mV. ・Oscilloscope CH-2 ・TP12/EF-16 board (A14) 	◐RV6/EF-16 board (A9) TRIG:HD:TP15/SG-115 board (C7) :TP14/SG-139 board (C6) GND:TPE2/EF-16 board (A7)

4-5-6. PGM/PST line pedestal level adjustment

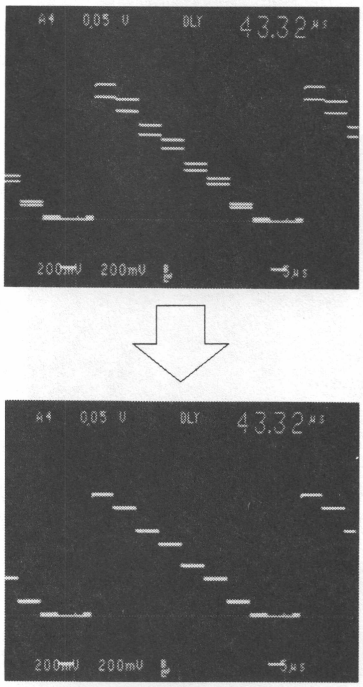
Machine conditions for adjustment	Measuring point and specification	Adjusting point
• Extend the board [EF-16 board] • Oscilloscope [NORMAL MODE] • PGM line select button [3] • PST line select button [3] • PGM/PST line WIPE button [ON] • PGM/PST line fader lever [mechanical center position]	1. TP12/EF-16 board (A14)  	◐RV26/EF-16 board (A15) TRIG:HD:TP15/SG-115 board (C7) :TP14/SG-139 board (C6) GND:TPE2/EF-16 board (A7)
• PGM line select button [1] • PST line select button [1] • PGM/PST line fader lever [top position]	2. TP12/EF-16 board (A14)  	◐RV19/EF-16 board TRIG:HD:TP15/SG-115 board (C7) :TP14/SG-139 board (C6) GND:TPE2/EF-106 board (A7)

Machine conditions for adjustment	Measuring point and specification	Adjusting point
• PGM/PST line fader lever [bottom position]	3. TP12/EF-16 board (A14)  	⊘RV29/EF-16 board (B12) TRIG:HD:TP15/SG-115 board (C7) :TP14/SG-139 board (C6) GND:TPE2/EF-106 board (A7)

4-5-7. PGM/PST line wipe shape distortion adjustment

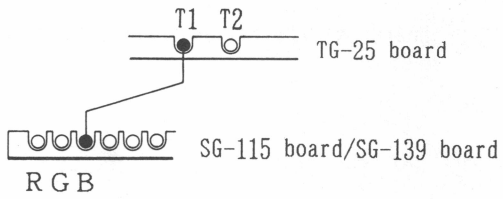
Machine conditions for adjustment	Measuring point and specification	Adjusting point
• Extend the board [EF-16 board] • Oscilloscope [NORMAL MODE] • PGM line select button [3] • PST line select button [3] • PGM/PST line fader lever [mechanical center position]	TP12/EF-16 board (A14)  	⊘RV24/EF-16 board (C12) TRIG:HD:TP15/SG-115 board (C7) :TP14/SG-139 board (C6) GND:TPE2/EF-16 board (A7)

4-5-8. PGM output level adjustment

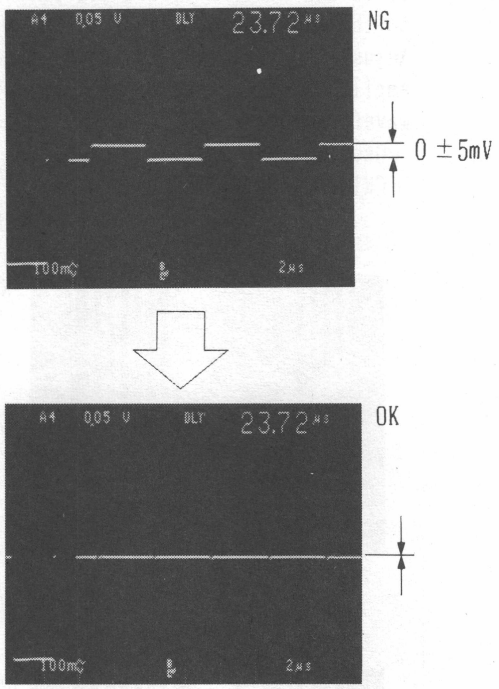
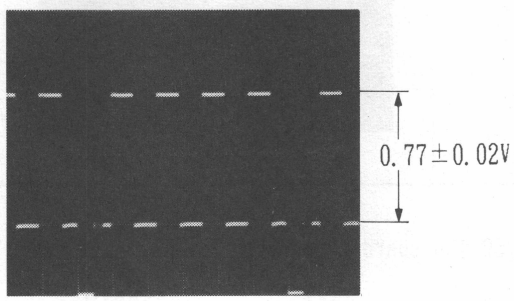
Machine conditions for adjustment	Measuring point and specification	Adjusting point
・Extend the board [EF-16 board] ・Oscilloscope [DUAL MODE] ・A-bus/B-bus line fader lever [top position] ・PGM/PST line fader lever [top position]	Calibrate the ground level of all oscilloscope channels to the same ground level and also calibrate all scope channels to the same range. Adjust the potentiometer until the waveform amplitude difference of the following two waveforms becomes 0±10mV. ・Oscilloscope CH-2 ・CN14(PGM OUT): Terminated in 75ohms/EF-16 board  NG 0±10mV OK	◐RV28/EF-16 board (A15) TRIG:HD:TP15/SG-115 board (C7) :TP14/SG-139 board (C6) GND:TPE2/EF-16 board (A7)

[Equipment setting addition]

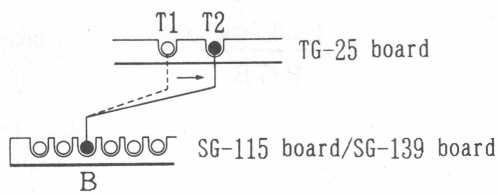
・Connect the SG-115 board CN8/SG-139 board CN7 (B OUT) connector to the TG-25 board CN1 (T1 IN) connector with the RF connector cable.



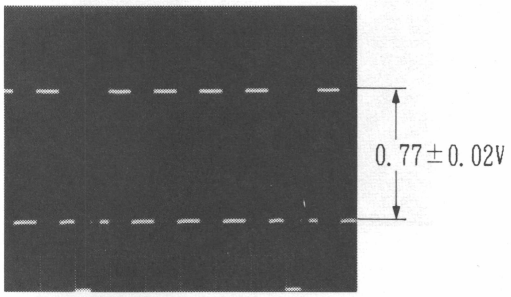
4-5-9. TITLE 1 level adjustment

Machine conditions for adjustment	Measuring point and specification	Adjusting point
• Extend the board [EF-16 board] • Oscilloscope [AC MODE] • A-bus line select button [3] • B-bus line select button [3] • PGM line select button [EFF] • PST line select button [EFF] • PGM/PST line MIX button [ON] • TITLE 1 button [ON] • TITLE COLOR 1 SAT control [↻ fully clockwise] • TITLE COLOR 1 LUM control [↻ fully clockwise] • TITLE COLOR 1 HUE control [↺ fully counterclockwise]	1. CN14 (PGM OUT 1): Terminated in 75ohms/EF-16 board.  	⊘RV14/EF-16 board (C11) TRIG:HD:TP15/SG-115 board (C7) :TP14/SG-139 board (C6)
• TITLE COLOR 1 HUE control [Find the position where the waveform amplitude is maximized and set.]	2. CN14 (PGM OUT 1): Terminated in 75ohms/EF-16 board.  	⊘RV13/EF-16 board (C11) TRIG:HD:TP15/SG-115 board (C7) :TP14/SG-139 board (C6)

[Setting alteration]
Remove the RF connector that is connected to the TG-25 board CN1 (T1 IN) and connect the RF connector to the CN2 (T2 IN) connector.

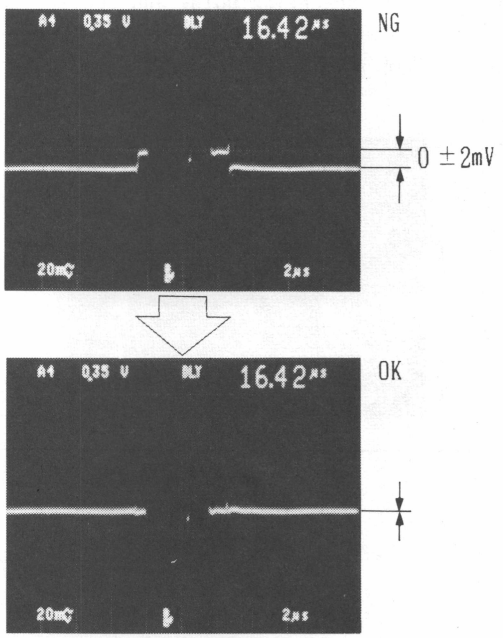


4-5-10. TITLE 2 level adjustment

Machine conditions for adjustment	Measuring point and specification	Adjusting point
• Extend the board [EF-16 board] • Oscilloscope [AC MODE] • [TITLE 2] button [ON] • TITLE COLOR 2 SAT control [↻ fully clockwise] • TITLE COLOR 2 LUM control [↻ fully clockwise] • TITLE COLOR 2 HUE control [↻ fully clockwise]	CN14 (PGM OUT 1): Terminated in 75ohms/EF-16 board.  	⊘RV25/EF-16 board (C14) TRIG:HD:TP15/SG-115 board (C7) :TP14/SG-139 board (C6)

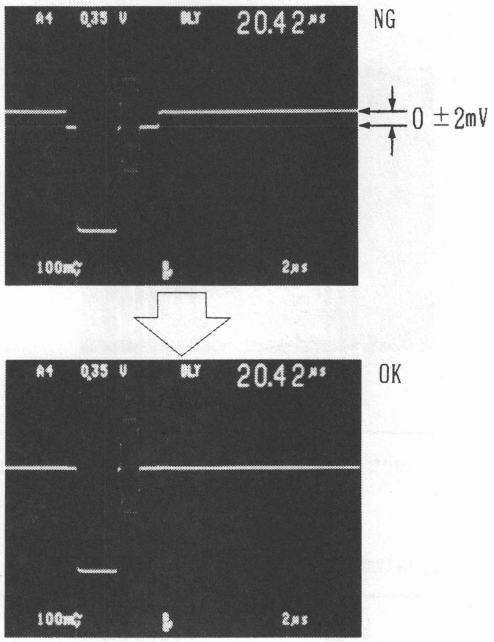
Note: After this adjustment is complete, set the [TITLE 1] and [TITLE 2] buttons to [OFF].

4-5-11. Program fader pedestal level adjustment

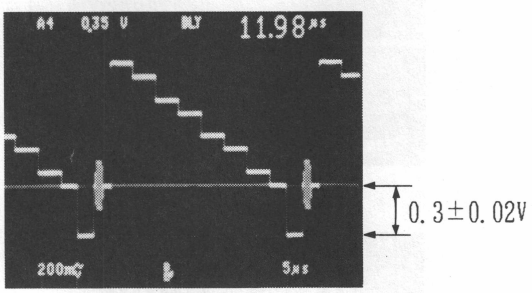
Machine conditions for adjustment	Measuring point and specification	Adjusting point
• Extene the board [EF-16 board] • Oscilloscope [AC MODE] • PGM line select button [3] • PST line select button [3] • Program fader lever [mechanical center position]	Set the program fader lever so that there is a biggest level difference. CN14 (PGM OUT 1): Terminated in 75ohms/EF-16 board  	⊘RV23/EF-16 board (B13) TRIG:HD:TP15/SG-115 board (C7) :TP14/SG-139 board (C6)

Note: When this adjustment is complete, the program fader lever is set to top position.

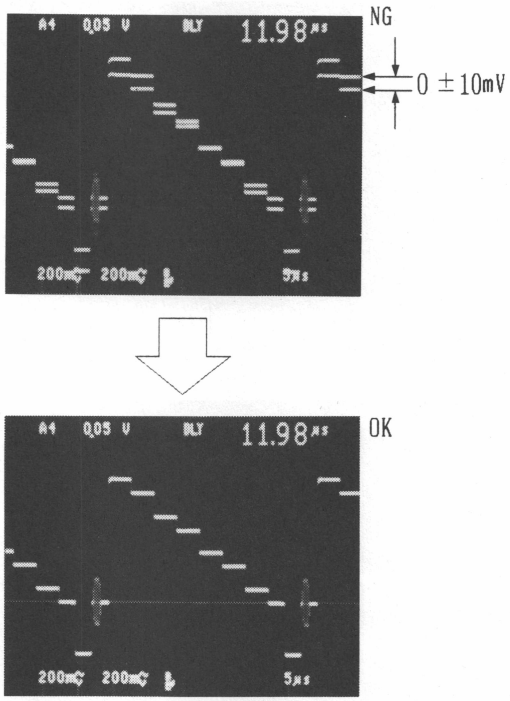
4-5-12. PGM output pedestal level adjustment

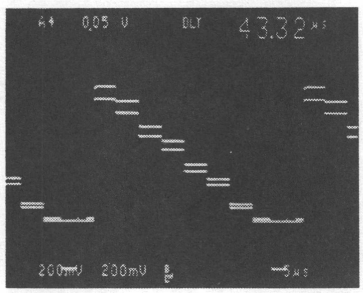
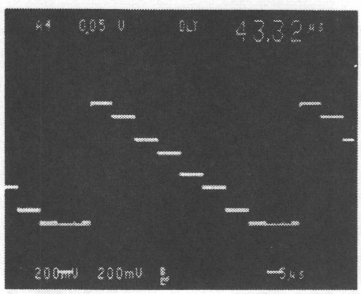
Machine conditions for adjustment	Measuring point and specification	Adjusting point
• Extend the board [EF-16 board] • Oscilloscope [NORMAL MODE]	CN14 (PGM OUT 1): Terminated in 75ohms/EF-16 board  	⊘RV26/EF-16 board (A15) TRIG:HD:TP15/SG-115 board (C7) :TP14/SG-139 board (C6)

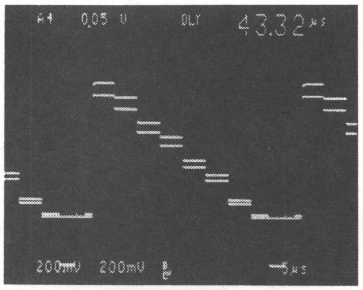
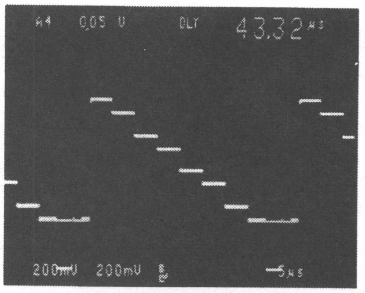
4-5-13. PGM output sync signal level adjustment

Machine conditions for adjustment	Measuring point and specification	Adjusting point
• Extend the board [EF-16 board] • Oscilloscope [AC MODE] • A-bus line select button [1] • B-bus line select button [1] • PGM line select button [1] • PST line select button [1]	CN14 (PGM OUT): Terminated in 75ohms/EF-16 board.  	⊘RV27/EF-16 board (B13) TRIG:HD:TP15/SG-115 board (C7) :TP14/SG-139 board (C6)

4-5-14. RET, VE, PVW output level adjustment

Machine conditions for adjustment	Measuring point and specification	Adjusting point
・Extend the board [EF-16 board] ・Oscilloscope [DUAL MODE]	1. Calibrate the ground level of all oscilloscope channels to the same ground level and also calibrate all scope channels to the same range. Adjust the potentiometer until the waveform amplitude difference of the following two waveforms becomes 0±10mV. ・CN14 (PGM OUT): Terminated in 75ohms/EF-16 board. ・CN11 (RE OUT): Terminated in 75ohms/EF-16 board. 	◐RV17/EF-16 board (B15) TRIG:HD:TP15/SG-115 board (C7) :TP14/SG-139 board (C6)

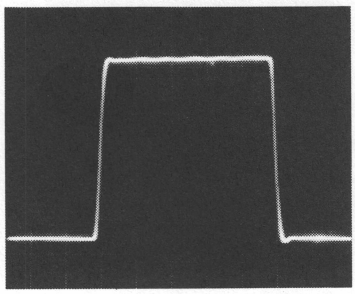
Machine conditions for adjustment	Measuring point and specification	Adjusting point
	2. Calibrate the ground level of all oscilloscope channels to the same ground level and also calibrate all scope channels to the same range. Adjust the potentiometer until the waveform amplitude difference of the following two waveforms becomes 0±10mV. • CN14 (PGM OUT): Terminated in 75ohms/EF-16 board. • CN12 (VE OUT): Terminated in 75ohms/EF-16 board.  NG  OK	⊘RV18/EF-16 board (A12) TRIG:HD:TP15/SG-115 board (C7) :TP14/SG-139 board (C6)

Machine conditions for adjustment	Measuring point and specification	Adjusting point
	3. Calibrate the ground level of all oscilloscope channels to the same ground level and also calibrate all scope channels to the same range. Adjust the potentiometer until the waveform amplitude difference of the following two waveforms becomes 0±10mV. ・CN14 (PGM OUT): Terminated in 75ohms/EF-16 board. ・CN13 (VE OUT): Terminated in 75ohms/EF-16 board.  NG  OK	◐RV22/EF-16 board (A13) TRIG:HD:TP15/SG-115 board (C7) :TP14/SG-139 board (C6)

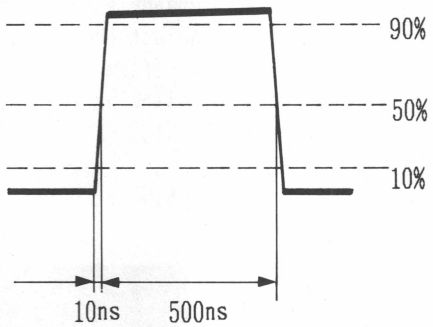
[Setting alteration]

- Remove all RF connectors that are connected to the EF-16 board, to the SG-139 board/SG-139 board, and to the TG-25 board.

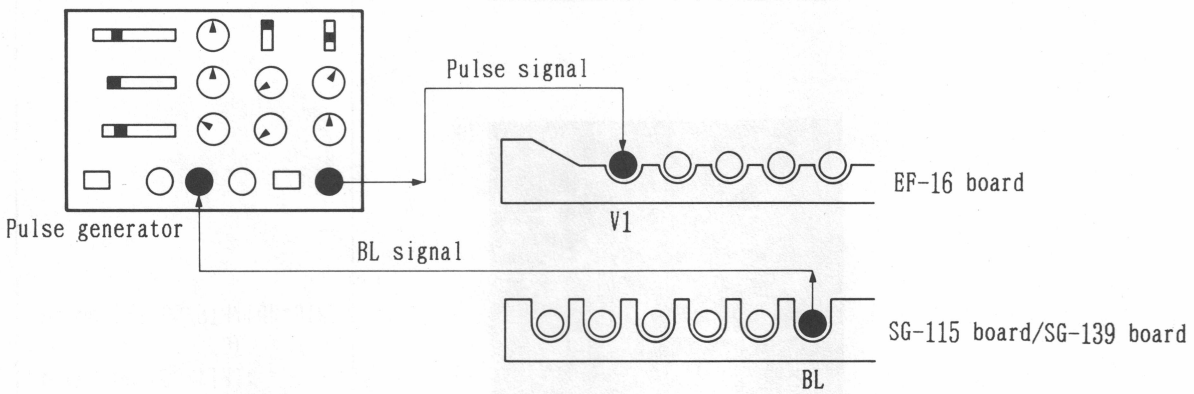
- Set the pulse generator to generate its output pulse signal as shown below.



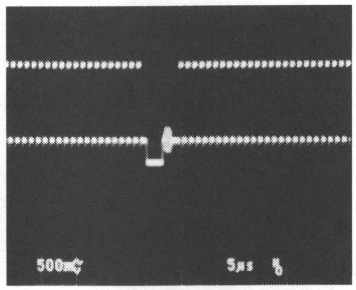
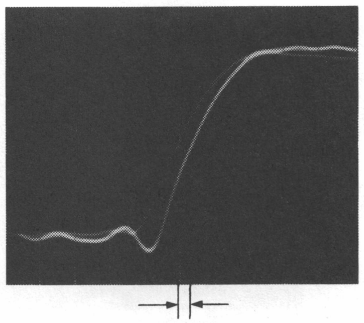
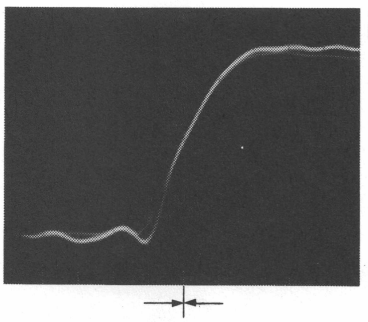
Frequency: 1 MHz

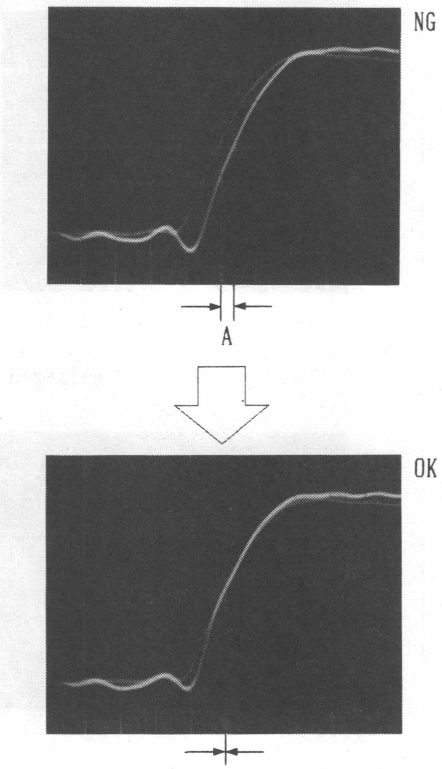


- Connect the pulse generator (YHP:8012B or equivalent) as shown below.



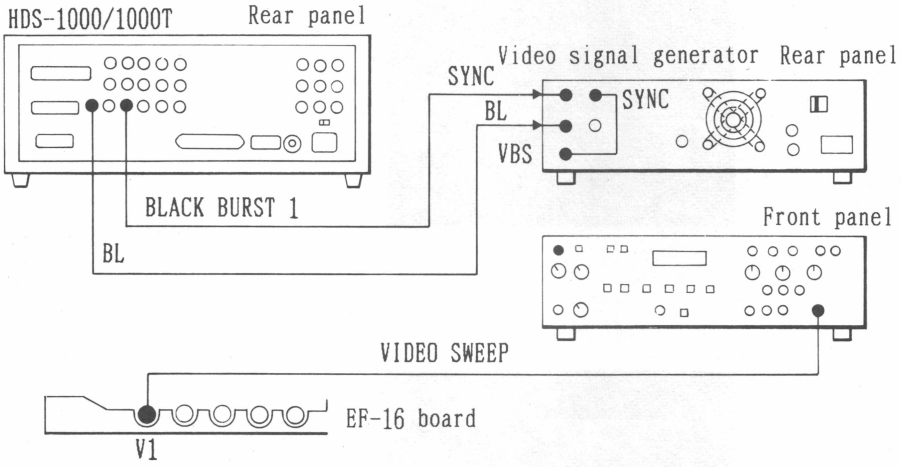
4-5-15. Adjustments of phase difference between A-bus/B-bus line and PGM/PST line

Machine conditions for adjustment	Measuring point and specification	Adjusting point
• Extend the board [EF-16 board] • Oscilloscope [AC MODE] • PST line select button [EFF] • PGM line select button [1] • Wipe select button [▬] • PGM/PST line fader lever [mechanical center position]	1. Phase difference : A as shown below, between A-bus/B-bus line and PGM/PST line should be minimized. PGM OUT (CN14): Terminated in 75ohms  enlarged  NG A  OK	◐CV6/EF-16 board (A9) TRIG:HD:TP15/SG-115 board (C7) :TP14/SG-139 board (C6) GND:TPE2/EF-16 board (A7)

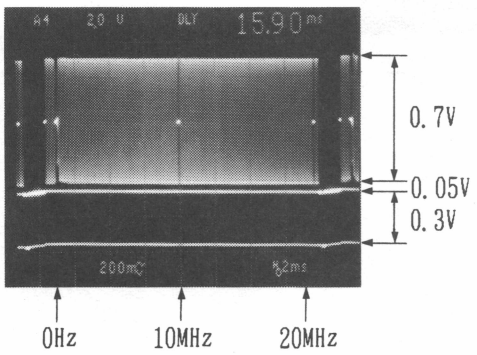
Machine conditions for adjustment	Measuring point and specification	Adjusting point
• PST line select button [1] • PGM line select button [EFF]	2. Phase difference : A as shown below, between A-bus/B-bus line and PGM/PST line should be minimized. TP12/EF-16 board (A14)  	◐CV4/EF-16 board (B9) TRIG:HD:TP15/SG-115 board (C7) :TP14/SG-139 board (C6) GND:TPE2/EF-16 board (A7)

[Setting alteration]

- Remove the RF connectors that are connected to the EF-16 board and SG-115/SG-139 boards.
- Re-connect the original RF connectors (coming from the BNC connectors on the rear panel) to CN4(BB1), CN5(BB2), and CN6(BL) of the SG-115 board.
- Re-connect the original RF connectors (coming from the BNC connectors on the rear panel) to CN3(SY1), CN4(SY2), and CN2(BL) of the SG-139 board.
- Connect a video signal generator (Shiba Sokku: VS13A0 or equivalent) to the equipment as shown below.

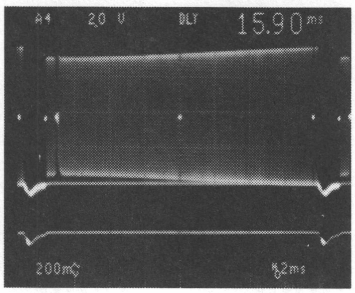
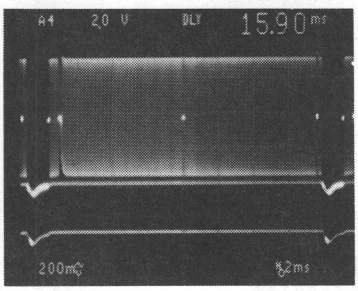


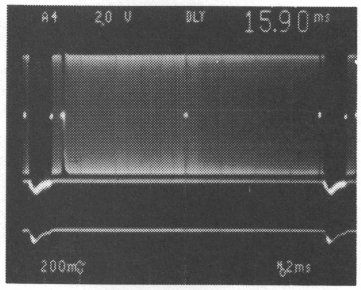
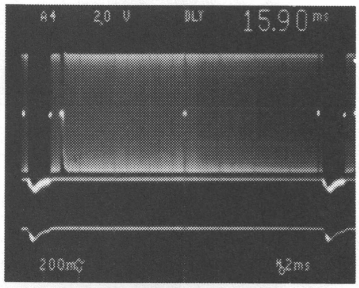
- Set the video signal generator to generate its output signal as shown below.



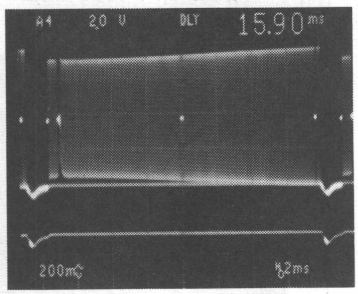
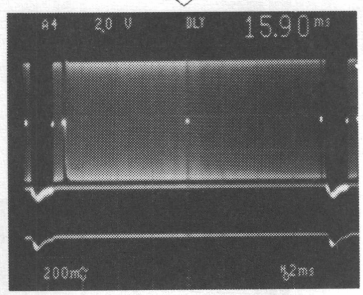
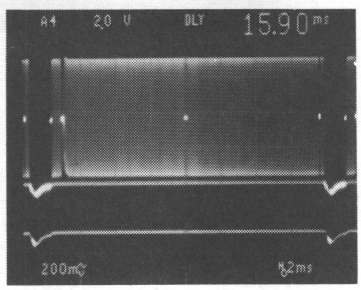
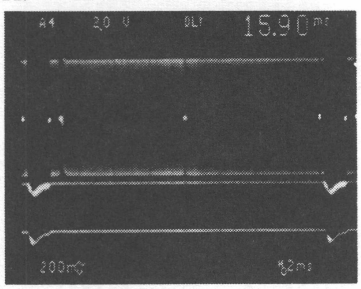
The waveform as shown includes frequency markers at 0Hz, 10MHz, and 20MHz.

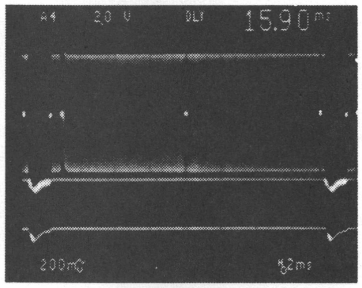
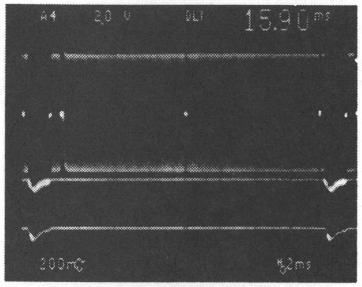
4-5-16. A-bus/B-bus line frequency response adjustment

Machine conditions for adjustment	Measuring point and specification	Adjusting point
• Extend the board [EF-16 board] • Oscilloscope [AC MODE] • PST line select button [1] • PGM/PST line fader lever [top position]	1. Adjust the potentiometer so that frequency response in the range from 0MHz to 20MHz is as flat as possible.  NG  OK	●CV1/EF-16 board (B7) TRIG:HD:TP3/SG-115 board (C7) :TP5/SG-139 board (C6) GND:TPE2/EF-16 board (A7)

Machine conditions for adjustment	Measuring point and specification	Adjusting point
	2. Adjust the potentiometer so that frequency response in the range from 0MHz to 20MHz is as flat as possible. TP6/EF-16 board (B9) 	⊘CV2/EF-16 board (B7) TRIG:VD:TP3/SG-115 board (C7) :TP5/SG-139 board (C6) GND:TPE2/EF-16 board (A7)
• A-bus/B-bus line [MIX] button [ON] • PGM line select button [EFF] • PST line select button [EFF]	3. Adjust the potentiometer so that frequency response in the range from 0MHz to 20MHz is as flat as possible. TP9/EF-16 board (B11) 	⊘CV7/EF-16 board (B11) TRIG:VD:TP3/SG-115 board (C7) :TP5/SG-139 board (C6) GND:TPE2/EF-16 board (A7)

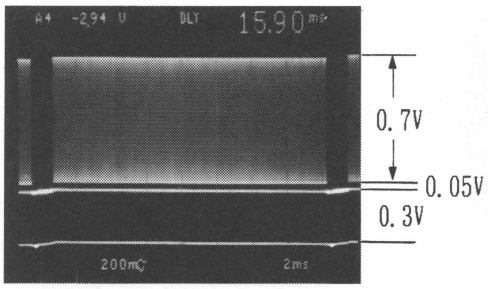
4-5-17. PGM/PST line frequency response adjustment

Machine conditions for adjustment	Measuring point and specification	Adjusting point
• Extension board [EF-16 board] • Oscilloscope [AC MODE] • PGM/PST line [MIX] button [ON]	1. Adjust the potentiometer so that frequency response in the range from 0MHz to 20MHz is as flat as possible. TP12/EF-16 board (A14)  NG  OK	⊘CV8/EF-16 board (C13) TRIG:VD:TP3/SG-115 board (C7) :TP5/SG-139 board (C6) GND:TPE2/EF-16 board (A7)
• PGM/PST line fader lever [bottom position]	2. Adjust the potentiometer so that frequency response in the range from 0MHz to 20MHz is as flat as possible. TP12/EF-16 board (A14) 	⊘CV9/EF-16 board (B14) TRIG:VD:TP3/SG-115 board (C7) :TP5/SG-139 board (C6) GND:TPE2/EF-16 board (A7)
• PGM line select button [1] • PST line select button [1]	3. Adjust the potentiometer so that frequency response in the range from 0MHz to 20MHz is as flat as possible. TP12/EF-16 board (A14) 	⊘CV5/EF-16 board (A8) TRIG:VD:TP3/SG-115 board (C7) GND:TPE2/EF-16 board (A7)

Machine conditions for adjustment	Measuring point and specification	Adjusting point
・PGM/PST line fader lever [top position]	4. Adjust the potentiometer so that frequency response in the range from 0MHz to 20M Hz is as flat as possible. TP12/EF-16 board (A14) 	●CV3/EF-16 board (A8) TRIG:VD:TP3/SG-115 board (C7) GND:TPE2/EF-16 board (A7)
	5. Adjust the potentiometer so that frequency response in the range from 0MHz to 20MHz is as flat as possible. CN14 (PGM OUT): Terminated in 75ohms/EF-16 board 	●CV10/EF-16 board (A14) TRIG:VD:TP3/SG-115 board (C7) :TP5/SG-139 board (C6)

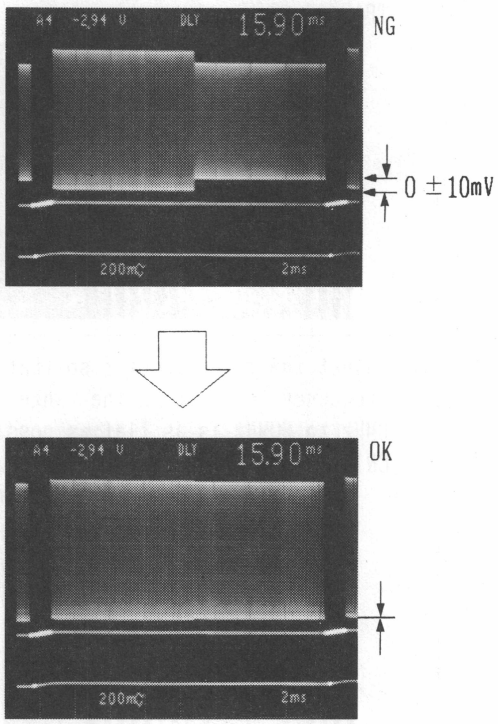
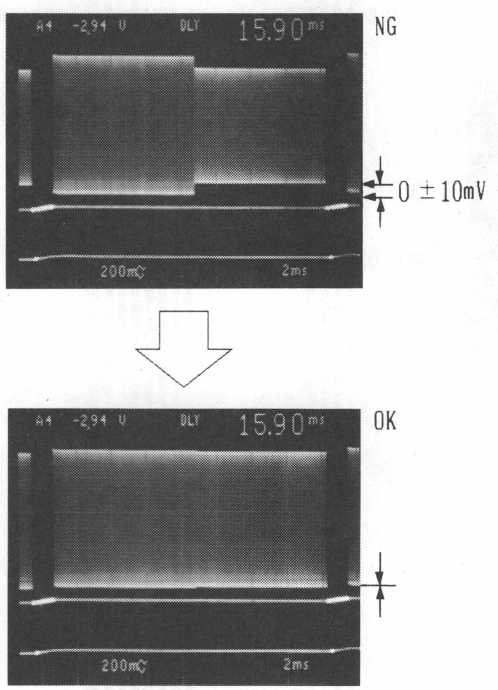
[Setting alteration]

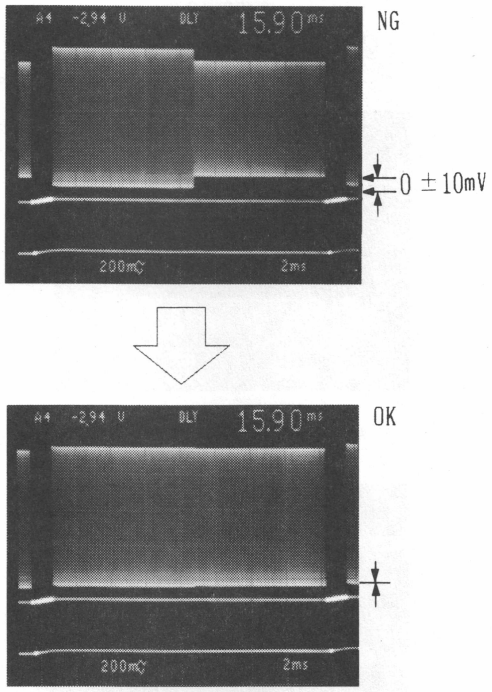
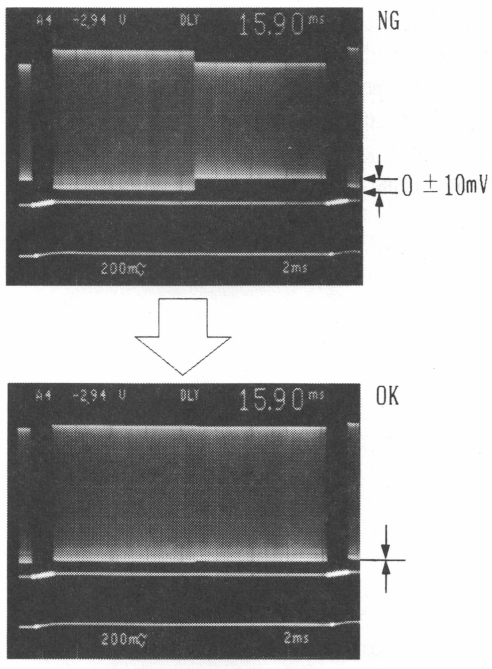
・Change the video signal generator setting to generate an output signal as shown.

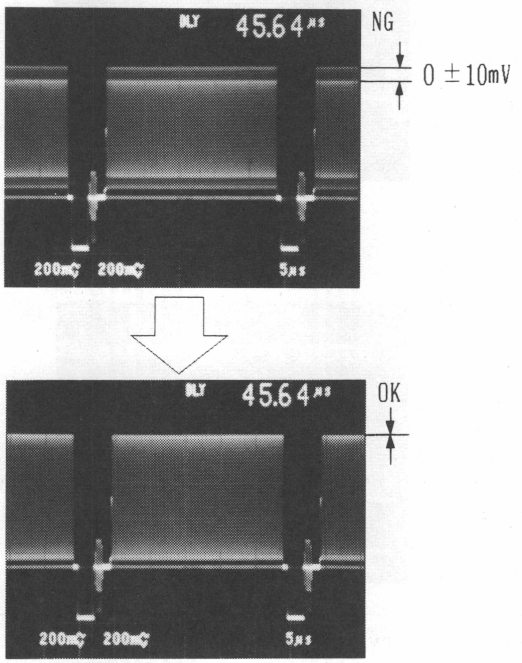


20 MHz constant

4-5-18. Frequency response chracteristics adjustment

Machine conditions for adjustment	Measuring point and specification	Adjusting point
• Extend the board [EF-16 board] • Oscilloscope [AC MODE] • PGM line select button [EFF] • PST line select button [EFF] • A-bus/B-bus line WIPE button [ON] • Wipe select button [▬] • A-bus/B-bus line fader lever [mechanical center position]	1. CN14 (PGM OUT): Terminated in 75ohms/EF-16 board.  	◆CV1/EF-16 board (B7) TRIG:HD:TP3/SG-115 board (C7) :TP5/SG-139 board (C6)
• A-bus/B-bus line MIX button [ON] • PGM/PST line WIPE button [ON] • Wipe select button [▬] • A-bus/B-bus line fader lever [top position] • PGM/PST line fader lever [mechanical center position]	2. CN14 (PGM OUT): Terminated in 75ohms/EF-16 board.  	◆CV2/EF-16 board (B7) TRIG:VD:TP3/SG-115 board (C7) :TP5/SG-139 board (C6)

Machine conditions for adjustment	Measuring point and specification	Adjusting point
• PST line select button [1]	3. CN14 (PGM OUT): Terminated in 75ohms/EF-16 board.  	◎CV5/EF-16 board (A8) TRIG:VD:TP3/SG-115 board (C7) :TP5/SG-139 board (C6)
• PST line select button [EFF] • PGM line select button [1]	4. CN14 (PGM OUT): Terminated in 75ohms/EF-16 board  	◎CV3/EF-16 board (A8) TRIG:VD:TP3/SG-115 board (C7) :TP5/SG-139 board (C6)

Machine conditions for adjustment	Measuring point and specification	Adjusting point
・PGM/PST line fader lever [top position]	5. The difference between the following two video signal amplitudes should be 0±10mV ・IC10 pin 8/EF-16 board (C1) ・CN14 (PGM OUT): Terminated in 75ohms/EF-16 board  	●CV10/EF-16 board (A14) TRIG:VD:TP3/SG-115 board (C7) :TP5/SG-139 board (C6)

[Equipment setting after completion of adjustment]

・Find the shorting resistor that has been temporarily connected to the SG-115 board JR12. Remove the shorting resistor from JR12 and connect it to JR11.
・Find the shorting socket that has been temporarily connected to the SG-139 board SH2. Remove the shorting socket from SH2 and connect it to SH1.
・Remove all the connections of the signal generator used for adjustments.
・Return all the RF connectors' connections to their original connections.

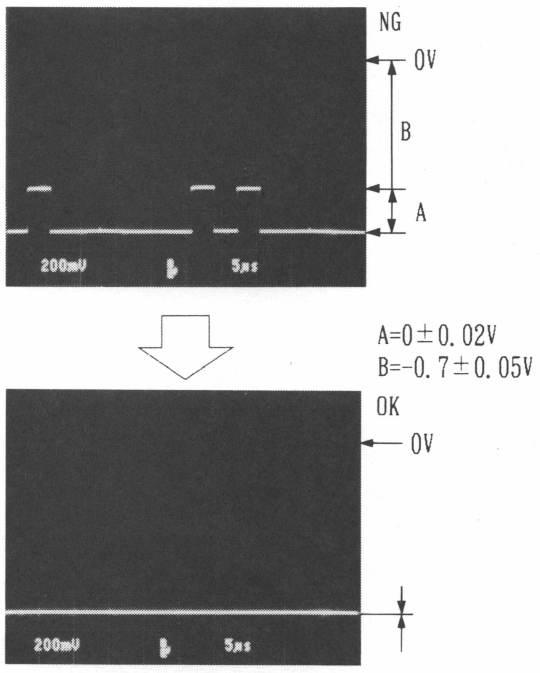
4-6. CRK-1 Board Adjustment

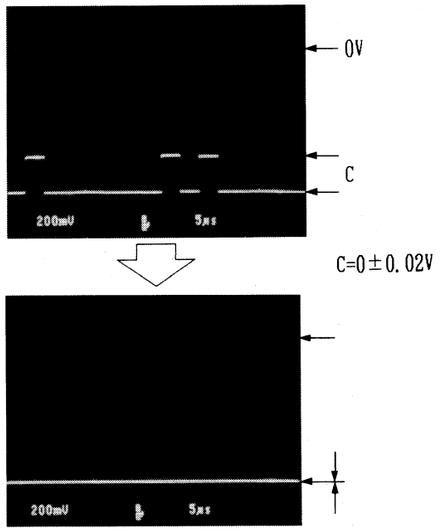
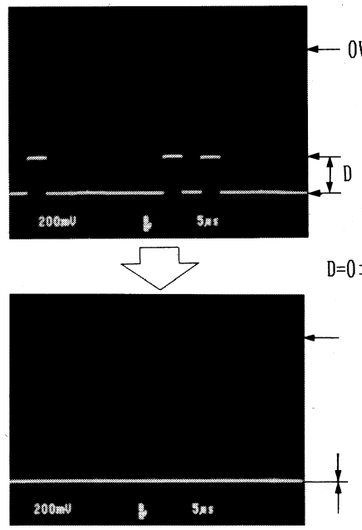
[Description of adjustment]
This section provides adjustment procedure for the color cancel function of chroma key using a color-bar signal.

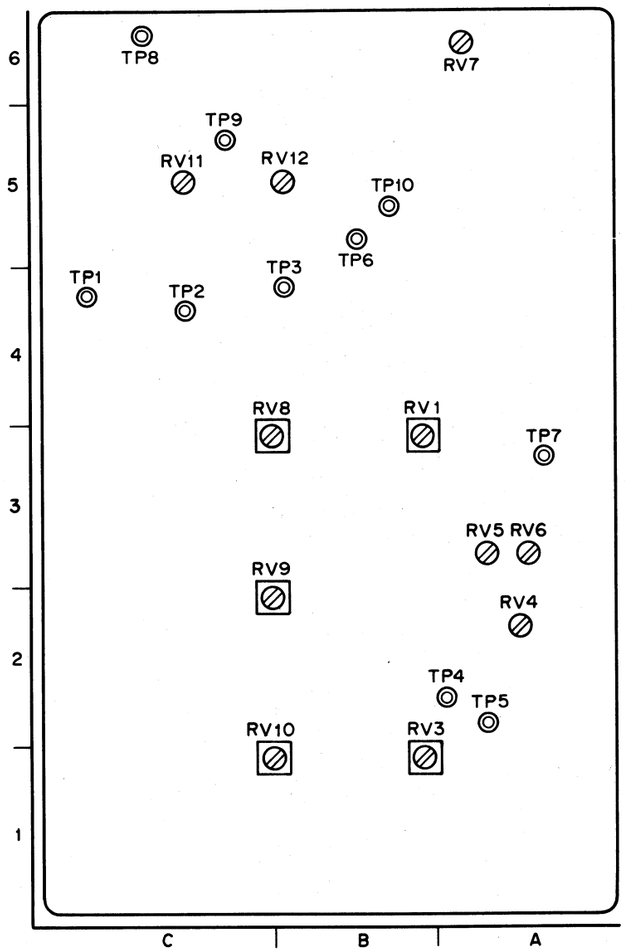
[Caution]
- All the printed circuit boards should be plugged into their home positions and the wiring of RF connector cables should be complete.

[Equipment required]
- Digital voltmeter
- Oscilloscope (dual track, more than 100MHz)

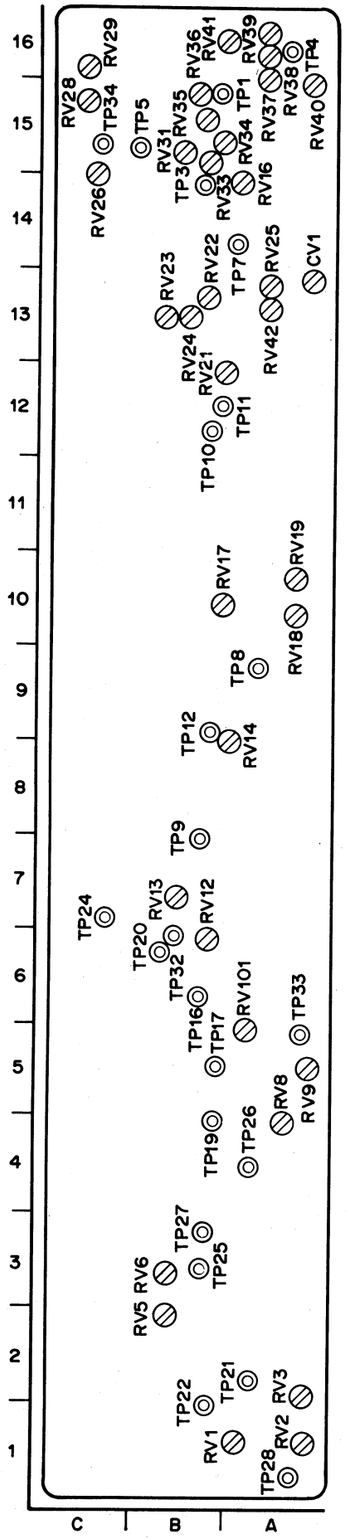
[Preparation]
- Remove the ornamental panel from the operation panel.
- Put the operation panel controls into their pre-set conditions.

Machine conditions for adjustment	Measuring point and specification	Adjusting point
• Digital voltmeter [DC MODE] • Oscilloscope [NORMAL MODE] • A-bus line select button [6] • Chroma key color select button [Blue] • Color cancel LUM control [mechanical center position] SAT control [mechanical center position] HUE control [mechanical center position] • A-bus/B-bus line fader lever [top position]	1. In-line connector pin 20/CRK-1 board (A3) 1.0V	⊘RV8:color cancel HUE control/CRK-1 board (C3) GND:TP11/KY-99 board (M12)
	2. TP-8/CRK-1 board (C6) 	A:⊘RV4/CRK-1 board (A2) B:⊘RV7/CRK-1 board (A6) TRIG:HD:TP15/SG-115 board (C7) :TP14/SG-137 board (C6) GND:TP11/KY-99 board (M12)

Machine conditions for adjustment	Measuring point and specification	Adjusting point
	3. In-line connector pin 21 CRK-1 board (A3) 1.0V	◐RV9:Color cancel SAT control/CRK-1 board (C2) GND:TP11/KY-99 board (M12)
	4. TP9/CRK-1 board (C5)  C=0±0.02V	◐RV5/CRK-1 board (A3) TRIG: GND:TP11/KY-99 board (M12)
	5. In-line connector pin 22/CRK-1 board (A3) 1.0V	◐RV8:Color cancel HUE control/CRK-1 board (C3) GND:TP11/KY-99 board (M12)
	6. TP-10/CRK-1 board (B5)  D=0±0.02V	◐RV6/CRK-1 board (A3) TRIG:HD:TP15/SG-115 board (C7) :TP14/SG-137 board (C6) GND:TP11/KY-99 board (M12)



CRK-1
COMPONENT SIDE



WP-18
COMPONENT SIDE

4-7. WP-18 Board Final Adjustment

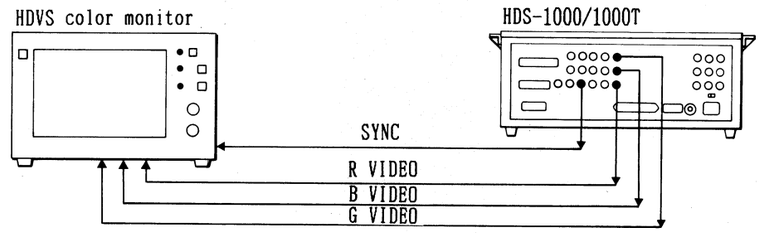
[Description of adjustment]
This section provides wipe shape adjustment by actually generating wipe shapes on the monitor screen (under-scanned picture size) while watching the monitor screen to confirm specifications. The background color signal from the TG-25 board is used for this adjustment.

[Caution]
- All the circuit boards should be correctly installed in their slots. Perform all the connections of the RF connector cables.

[Equipment required]
- HDVS color monitor (Sony: HDM-1830 or equivalent)

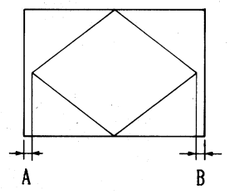
[Boards required]
- Extension board EX-118

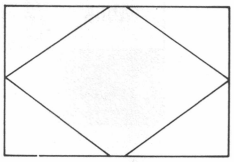
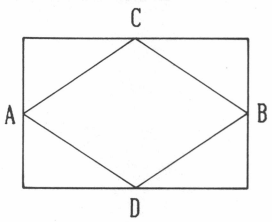
[Preparation]
- Connect the monitor and HDS-1000/1000T as shown.



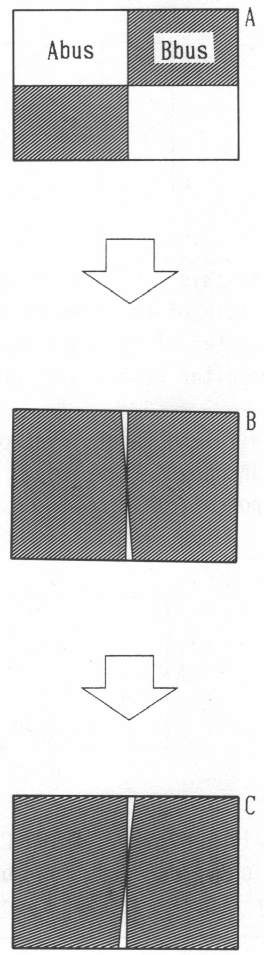
- Put the operation panel into its pre-set condition.

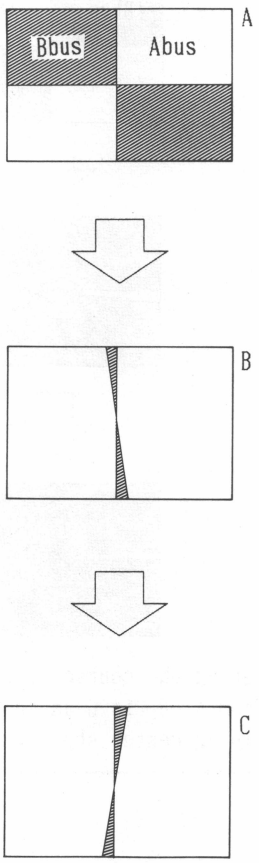
4-7-1. Diamond shaped wipe pattern adjustment

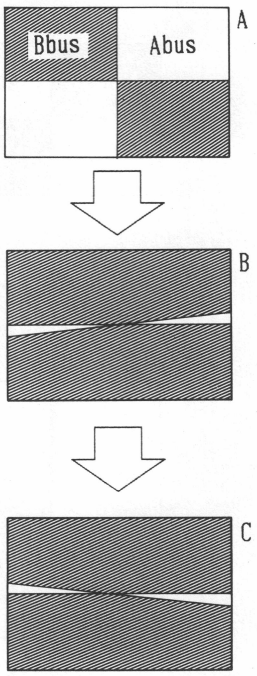
Machine conditions for adjustment	Measuring point and specification	Adjusting point
• Extend the board [WP-18 board] • Monitor [under-scanned picture size] • A-bus line select button [7] • B-bus line select button [1] • PGM line select button[EFF] • PST line select button [7] • A-bus/B-bus line WIPE button [ON] • Wipe select button [◆] • PGM/PST line fader lever [mechanical center position]	1. Move the A-bus/B-bus fader lever so that the horizontal width of the diamond shape is a little smaller than the horizontal width of the picture size.  A=B	◐RV28/WP-18 board (C14)

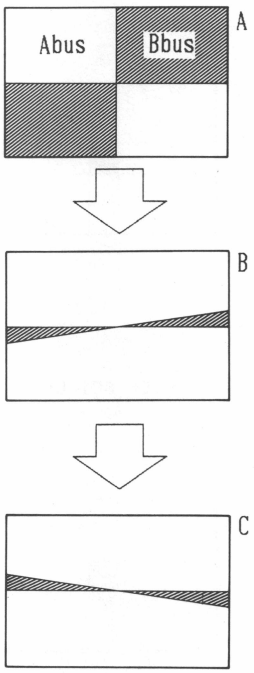
Machine conditions for adjustment	Measuring point and specification	Adjusting point
	2. Move the A-bus/B-bus line fader lever until the horizontal width of diamond pattern is equal to the horizontal width of the monitor screen size.  At this time, the center of vertical width of the diamond pattern and the center of the vertical width of the monitor screen size should coincide.	◐RV29/WP-18 board (C16)
	3. With the fader lever of the A-bus/B-bus unchanged from step 2, adjust the potentiometer.  All the points A, B, C, and D should be in contact with the monitor screen picture size simultaneously.	◐RV36/WP-18 board (B15)

4-7-2. Rotary wipe adjustment

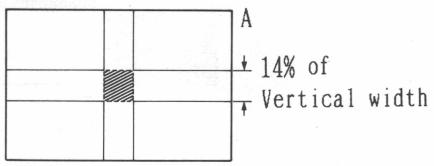
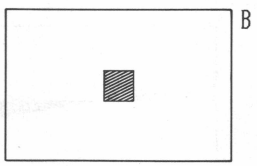
Machine conditions for adjustment	Measuring point and specification	Adjusting point
• Extene the board [WP-18 board] • Monitor scan [under-scanned picture size] • Wipe selection button [■] • Rotary button [ON]	1. Generate the monitor pictures as shown below by moving the A-bus/B-bus lever.  During the course of picture transition from A, B, to C as shown above, the wiping center should never move.	⊘RV26/WP-18 board (C14)

Machine conditions for adjustment	Measuring point and specification	Adjusting point
	2. Generate the monitor pictures as shown below by moving the A-bus/B-bus lever.  During the course of picture transition from A, B, to C as shown above, the wiping center should never move.	◐RV21/WP-18 board (B12)
	3. Finally, move the A-bus/B-bus lever between the top and bottom positions, and confirm that the wiping center does not move. If the wiping center should make any shift, repeat the above steps 1 and 2 until the shift is minimized.	

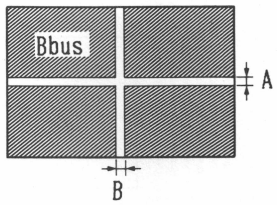
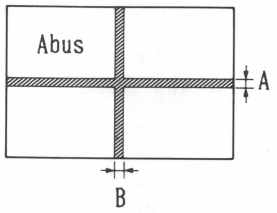
Machine conditions for adjustment	Measuring point and specification	Adjusting point
• Wipe selection button [▬]	4. Generate the monitor pictures as shown below by moving the A-bus/B-bus lever.  During the course of picture transition from A, B, to C as shown above, the wiping center should never move.	⊘RV22/WP-18 board (A10)

Machine conditions for adjustment	Measuring point and specification	Adjusting point
	5. Generate the monitor pictures as shown below by moving the A-bus/B-bus lever.  During the course of picture transition from A, B, to C as shown above, the wiping center should never move.	◐RV16/WP-18 board (A14)
	6. Lastly, move the A-bus/B-bus fader lever between the top and bottom positions, and confirm that the wiping center does not move. If the wiping center should make any shift, repeat the above steps 4 and 5 until the shift is minimized.	

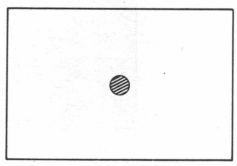
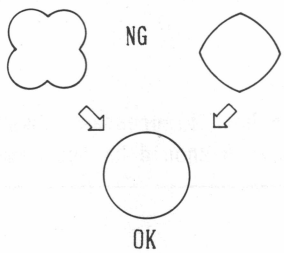
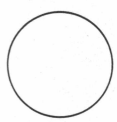
4-7-3. Rotary point adjustment

Machine conditions for adjustment	Measuring point and specification	Adjusting point
• Extend the board [WP-18 board] • Monitor scan [under-scanned picture size] • A-bus/B-bus fader lever [top position] • Rotary button [OFF] • Wipe selection button [▪]	1. Generate the monitor pictures as shown below by moving the A-bus/B-bus lever.  2. Select wipe selection button of [▪].  The size of the hatched area in figure B should be the same as the size of the hatched area in figure A.	⊘RV23/WP-18 board (C13) ⊘RV24/WP-18 board (C13)

4-7-4. Cross-pattern wipe adjustment

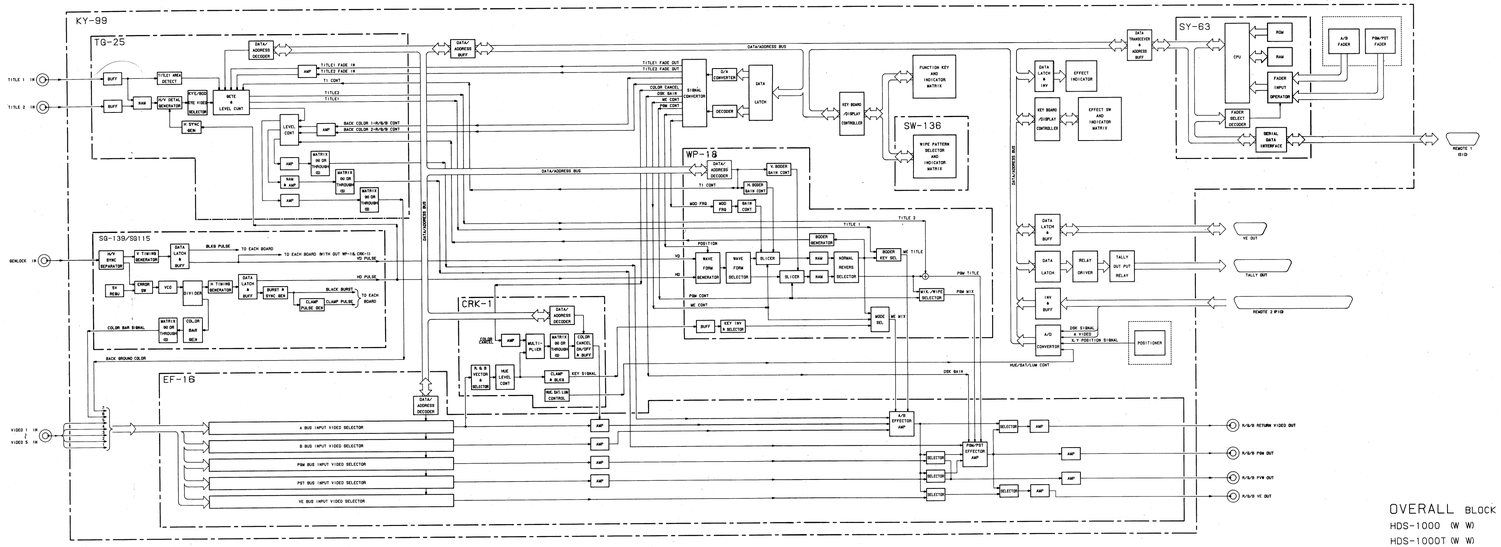
Machine conditions for adjustment	Measuring point and specification	Adjusting point
• Extend the board [WP-18 board] • Monitor scan [under-scanned picture size] • A-bus/B-bus fader lever [top position] • Wipe selection button [▣]	1. Adjust until the cross-pattern wipe has the thinnest size as shown by moving the A-bus/B-bus lever.   In both figures as shown above, size A and size B should be the same.	⊘RV35/WP-18 board (A16)

4-7-5. Circle wipe adjustment

Machine conditions for adjustment	Measuring point and specification	Adjusting point
• Extend the board [WP-18 board] • Monitor scan [under-scanned picture size] • A-bus/B-bus fader lever [top position] • Wipe selection button [◉]	1. Adjust until the circle-pattern wipe has the same size as a coin by moving the A-bus/B-bus fader lever. 	
	2. Trim the shape of the circle as shown. 	⊘RV33/WP-18 board (B15) ⊘RV39/WP-18 board (A16)
	3. Make the shape of the pattern as close as possible to that of a true circle. 	⊘RV40/WP-18 board (A16) ⊘CV1/WP-18 board (A13)
	4. Move the A-bus/B-bus fader lever between top and bottom positions, and observe that the circle shape does not distort even though the size of the circle pattern changes.	

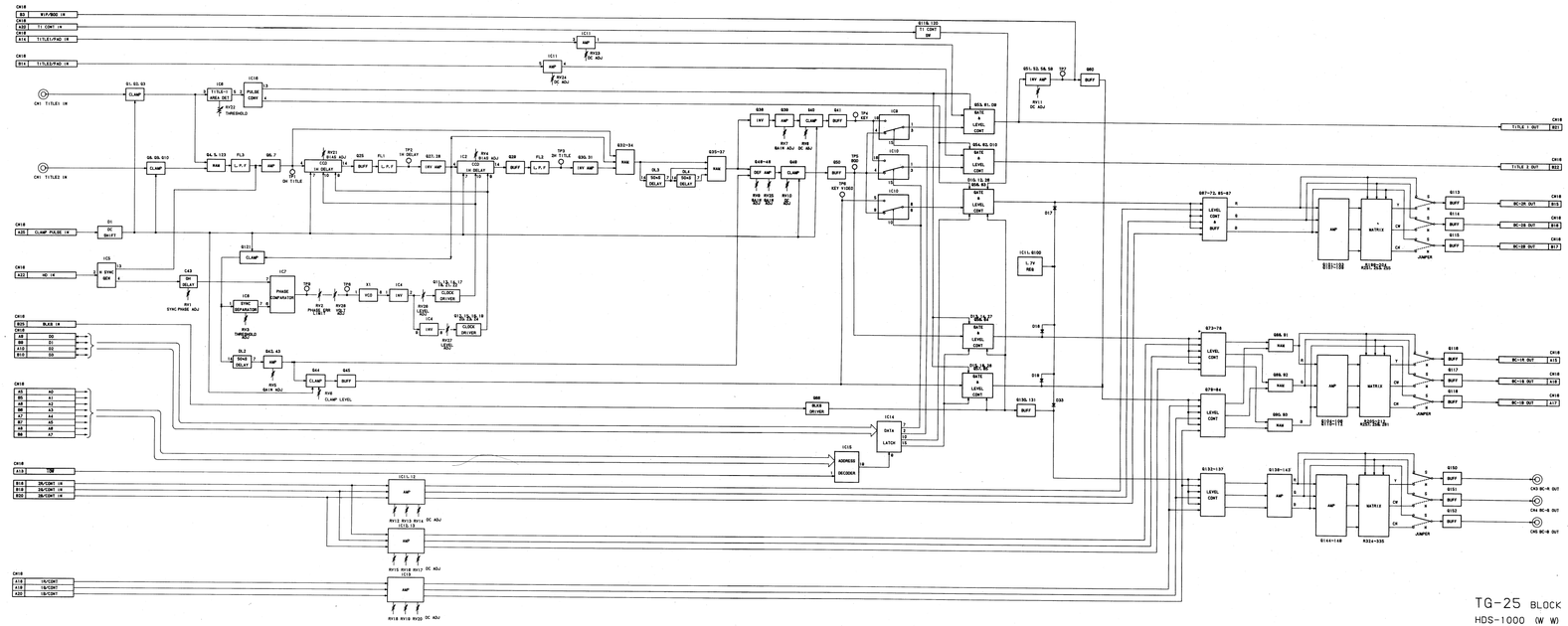
SECTION A
BLOCK DIAGRAMS

OVERALL BLOCK



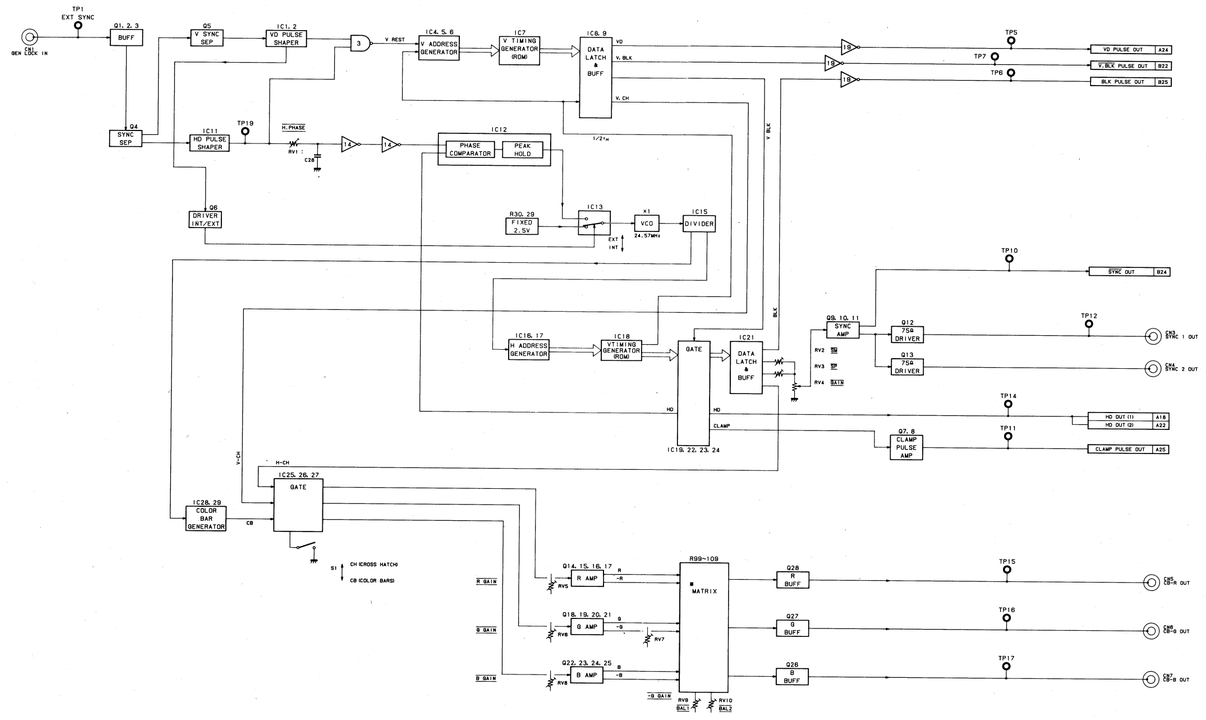
OVERALL BLOCK
HDS-1000 (W W)
HDS-1000T (W W)

TG-25BLOCK



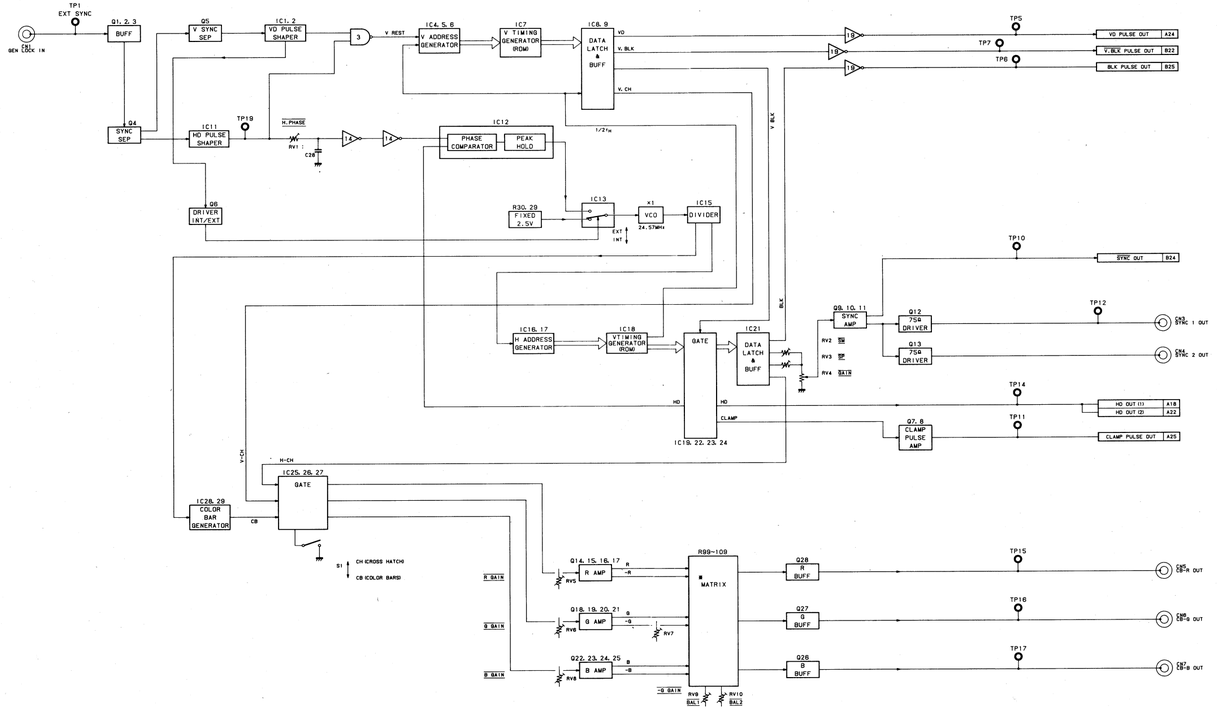
TG-25 BLOCK
HDS-1000 (W W)
HDS-1000T (W W)

SG-139 BLOCK



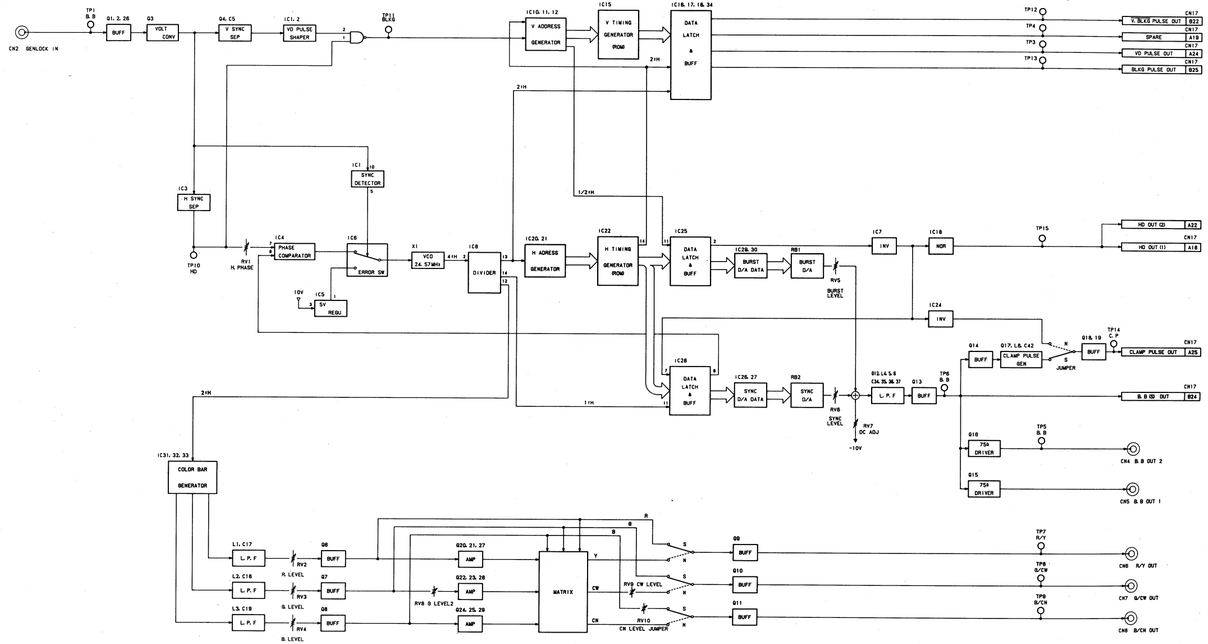
SG-139 BLOCK
HDS-1000T (W W)

SG-139 BLOCK



SG-139 BLOCK
HDS-1000T (W W)

SG-115 BLOCK

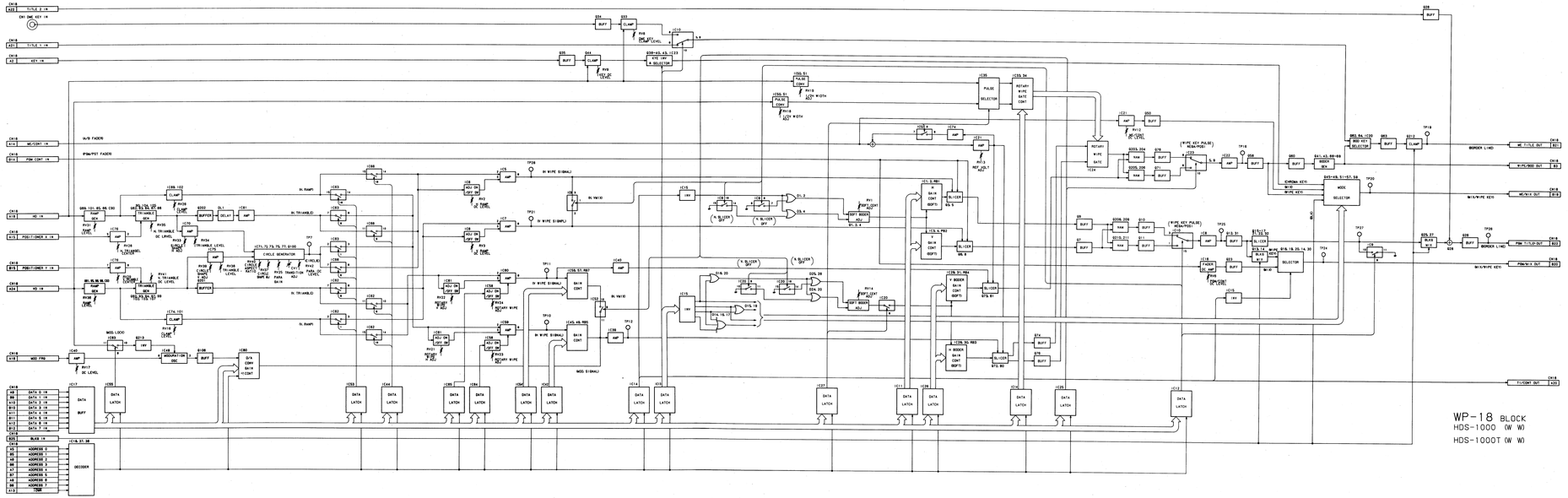


SG-115 BLOCK
HDS-1000 (W W)

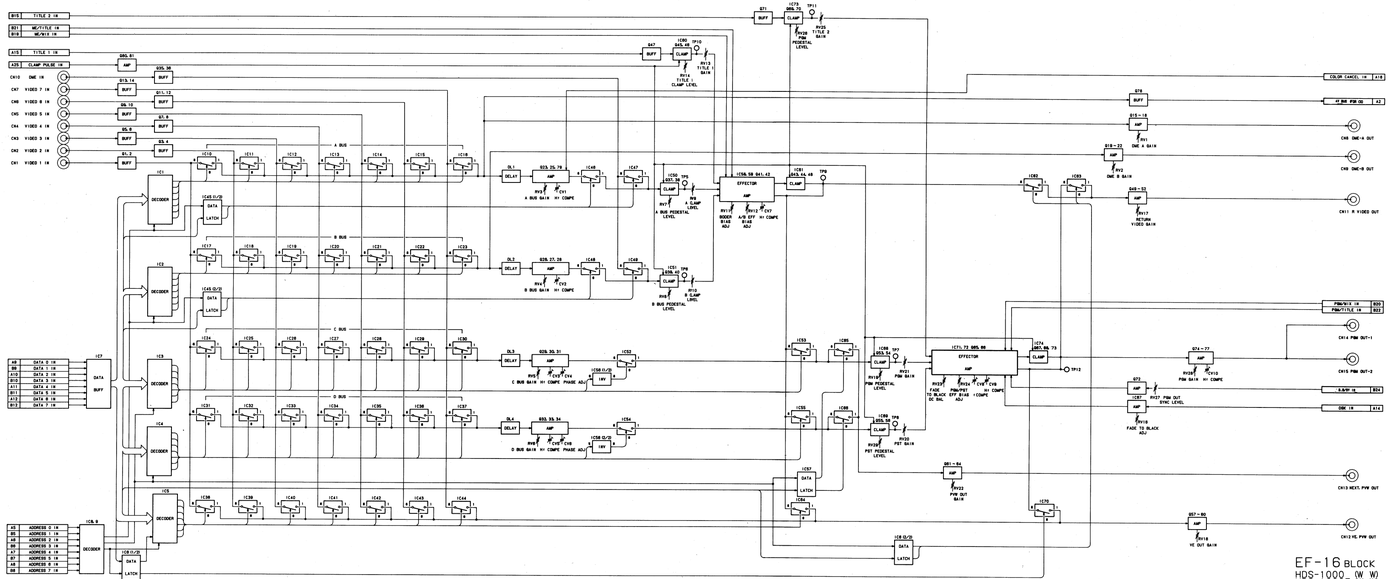
HDS-1000 | SG-115 B/D

SG-115 B/D | HDS-1000

WP-18 BLOCK

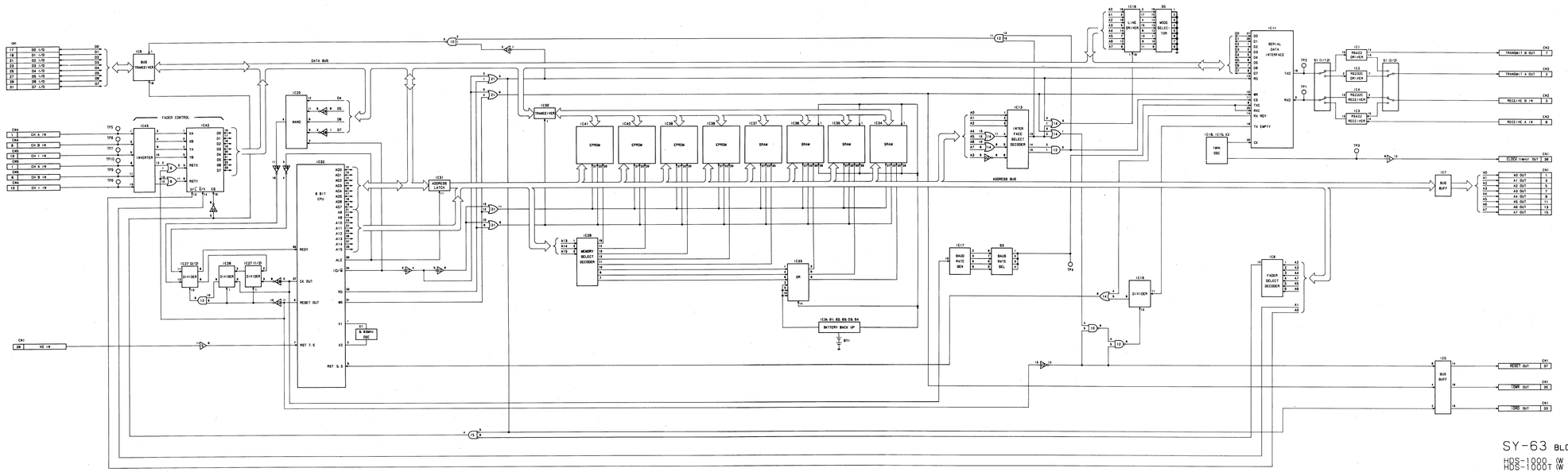


EF-16 BLOCK

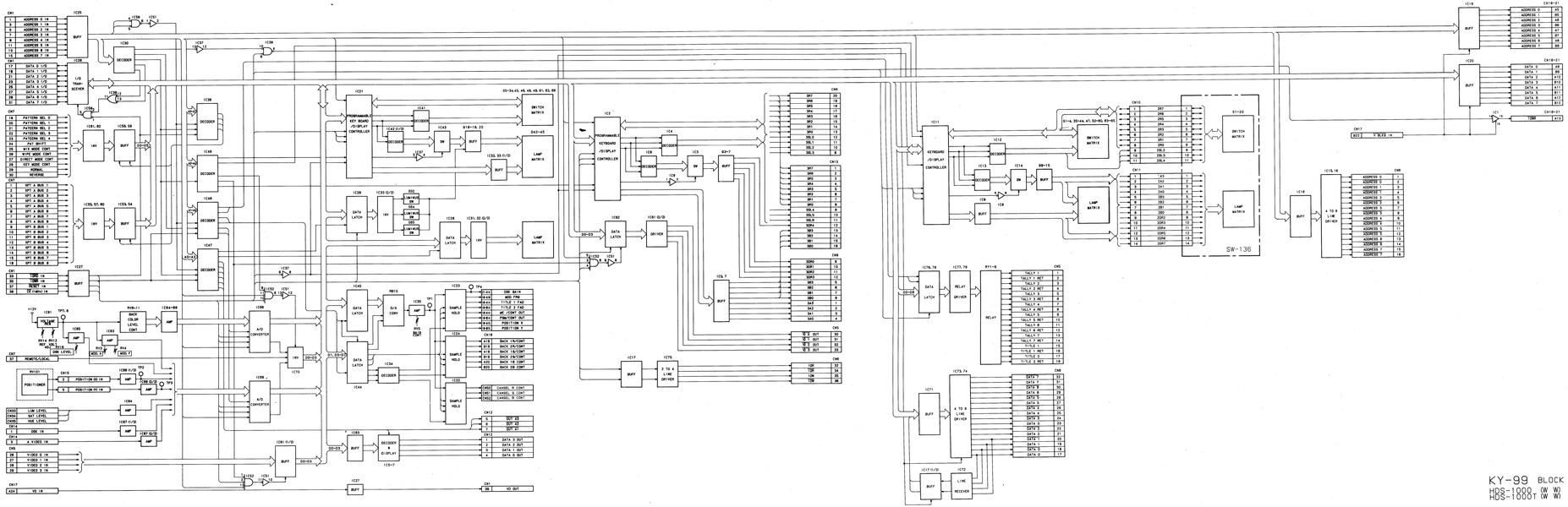


HDS-1000
HDS-1000T
SY-63 B/D
SY-63 B/D
HDS-1000
HDS-1000T

SY-63 BLOCK



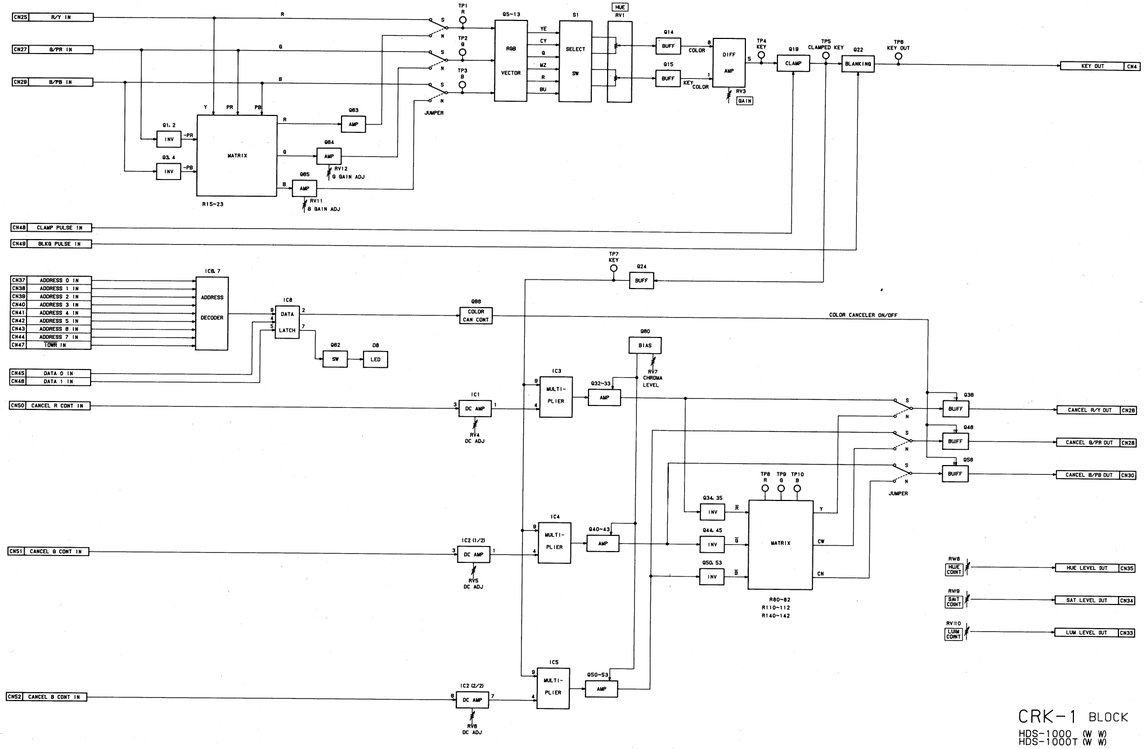
KY-99 BLOCK



KY-99 BLOCK
HDS-1000 (W W)
HDS-1000T (W W)

CRK-1 B/D
HDS-1000
HDS-1000T

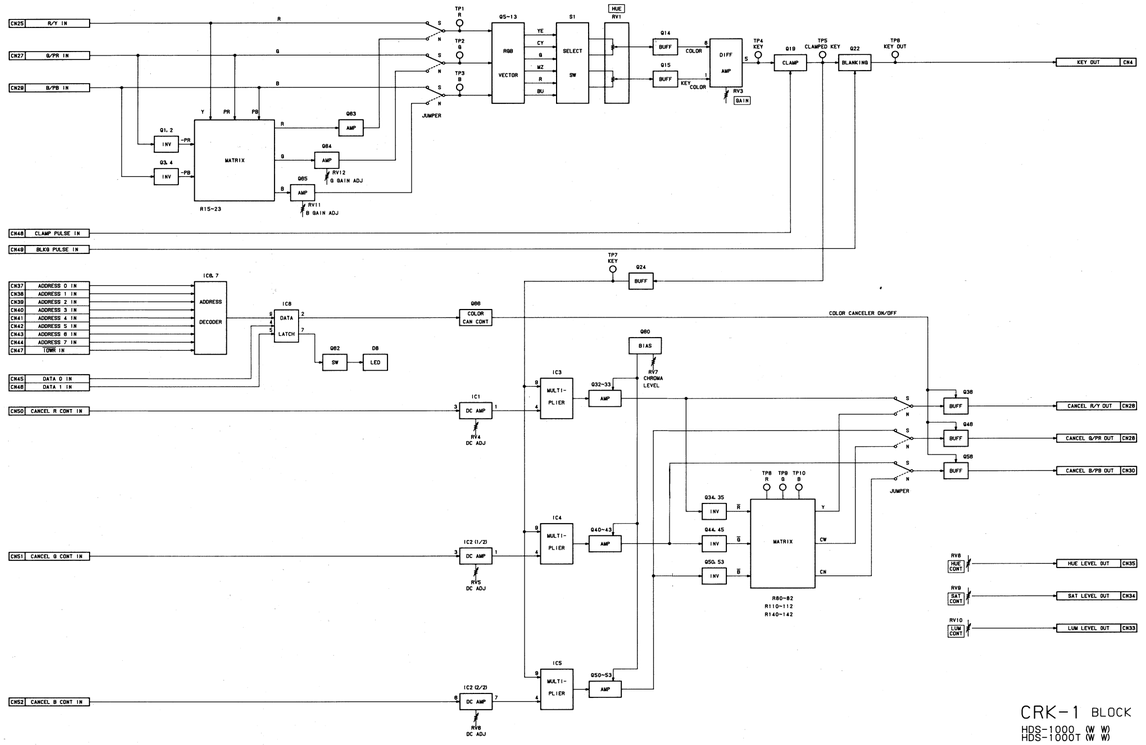
CRK-1 BLOCK



CRK-1 BLOCK
HDS-1000 (W W)
HDS-1000T (W W)

CRK-1 B/D
HDS-1000
HDS-1000T

CRK-1 BLOCK

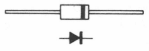


CRK-1 BLOCK
HDS-1000 (W W)
HDS-1000T (W W)

SECTION B
SEMICONDUCTOR PIN ASSIGNMENTS

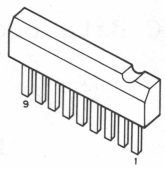
The circuit diagram of is obtained from the IC data book published by the manufacturer.

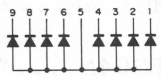
TYPE	PAGE
10DF2	B-2
10E-2	B-2
1S1555	B-2
1SS119	B-2
1SS133	B-2
1SS148	B-2
1SS168	B-2
2SA1005	B-2
2SA1015	B-2
2SA1175	B-2
2SA1206-K1	B-2
2SA952	B-2
2SC1815-Y	B-2
2SC2668	B-2
2SC2785	B-2
2SC2786-L	B-2
2SC2901	B-2
2SK152	B-2
5082-7300	B-3
74F283PC	B-3
AD580MH	B-3
AD7524JN	B-3
AM26LS31CN	B-3
AM26LS31PC	B-3
AM26LS32ACN	B-3
AM26LS32PC	B-3
BX1412	B-4
CA3080E	B-4
CA3102E-S1	B-4
CX23065	B-4
CXK5864PN-15L	B-4
DAN801	B-2
DAP801	B-2
ERA15-01	B-2
ERB12-??	B-2
GL9PR-20	B-2
HA3-2525-5	B-4
HDS01	B-4
HI1-0201-5	B-5
HI1-201HS-5	B-5
HI1-5043-5	B-5
HN17C64G-20	B-5
ICL8038BCJD	B-5
LM3046N	B-5
LM3080N	B-5
LM317T	B-5
LM337T	B-5
LT1033CK	B-5
LT350AK	B-5
M54517P	B-6
MBM27C32A-25	B-6
MB7124	B-6
MC1595L	B-6
MC74HC74N	B-6
MS1002-3	B-6
MSM80C85A -2RS	B-7
MSM82C51ARS	B-7
NE527H	B-8
NJM4558S	B-8
NJM78L??A	B-8
NJM79L??A	B-8
QSCH-1754	B-2
RD??EB?	B-2
S8054ALB	B-8
SLP155B	B-2
SN74128N	B-8
SN74ALS04AN	B-8
SN74ALS30AN	B-8
SN74ALS74AN	B-8
SN74ALS163BN	B-8
SN74HC138N	B-9
SN74LS04N	B-8
SN74LS123N	B-9
SN74LS138N	B-9
SN74LS139N	B-9
SN74LS145N	B-9
SN74LS221N	B-9
SN74LS244N	B-10
SN74LS374N	B-10
SN74LS641N	B-10
SN74S04N	B-8
SN75150P	B-10
SN75154N-R	B-10
SN75468N	B-10
TC4049BP	B-10
TC40H000P	B-11
TC40H004P	B-11
TC40H027P	B-11
TC40H032P	B-11
TC40H074P	B-11
TC40H138P	B-11
TC40H175P	B-11
TC40H244P	B-11
TC40H245P	B-12
TC40H273P	B-12
TC40H367P	B-12
TC40H368P	B-12
TC40H374P	B-12
TC5564PL-15	B-13
TC74HC00P	B-13
TC74HC02P	B-13
TC74HC04F	B-13
TC74HC04P	B-13
TC74HC08P	B-13
TC74HC123P	B-13
TC74HC138P	B-9
TC74HC14P	B-13
TC74HC147P	B-14
TC74HC153F	B-14
TC74HC157P	B-14
TC74HC163P	B-14
TC74HC174F	B-14
TC74HC175P	B-14
TC74HC237P	B-15
TC74HC240P	B-15
TC74HC244F	B-15
TC74HC244P	B-15
TC74HC245P	B-15
TC74HC32P	B-15
TC74HC373P	B-15
TC74HC374F	B-16
TC74HC374P	B-16
TC74HC4040P	B-16
TC74HC688P	B-16
TC74HC74F	B-6
TD62083AP	B-16
TL082CP	B-16
TL084CN	B-17
TL317LP	B-17
TL601CP	B-17
TLR123	B-2
uPC1663C	B-17
uPC4082C	B-16
uPC4558C	B-17
uPC78L05A	B-17
uPD4701AC	B-17
uPD7004C	B-18
uPD8279C-5	B-18



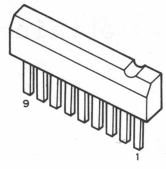
10DF2
10E-2
1S1555
1SS119
1SS133
1SS148
1SS168
ERA15-01
ERB12-? ?
QSCH-1754

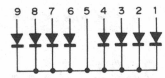
DAP801

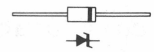




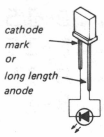
DAN801



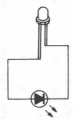




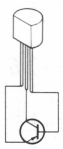
RD ? ?EB ?



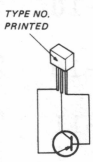
SLP155B ; RED
GL9PR20 ; RED



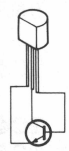
TLR123 ; RED



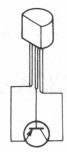
2SA1005
2SA1015
2SA952



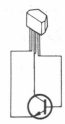
2SA1175



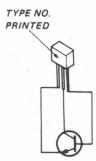
2SC1815



2SA1206

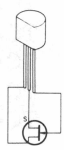


2SC2668



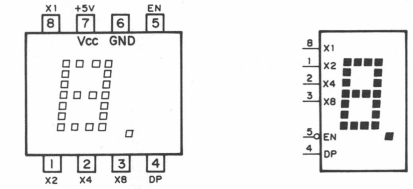
2SC2785
2SC2786

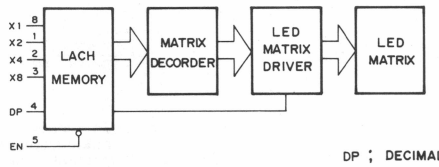
2SC2901



2SK152

5082-7300 (HP)
DECIMAL POINT DISPLAY
— TOP VIEW —



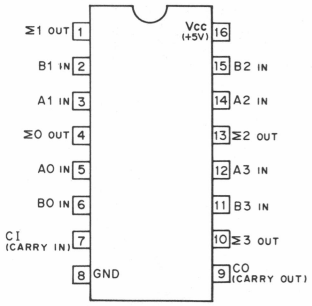


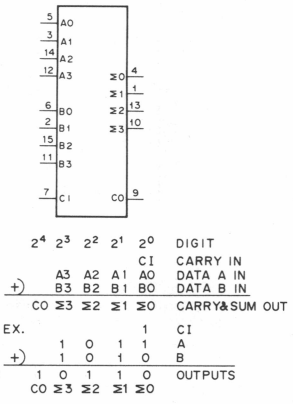
DP ; DECIMAL POINT

INPUTS					DISPLAY	
EN	X8	X4	X2	X1	DP; High level	DP; Low level
0	0	0	0	0	0.	0.
0	0	0	0	1	1.	1.
0	0	0	1	0	2.	2.
0	0	0	1	1	3.	3.
0	0	1	0	0	4.	4.
0	0	1	0	1	5.	5.
0	0	1	1	0	6.	6.
0	0	1	1	1	7.	7.
0	1	0	0	0	8.	8.
0	1	0	0	1	9.	9.
0	1	0	1	0	8	8.
0	1	0	1	1	BLANK	.
X	1	1	0	0	BLANK	.
0	1	1	0	1	....	.....
X	1	1	1	X	BLANK	.

0 ; LOW LEVEL
1 ; HIGH LEVEL
X ; DONT CARE

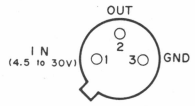
74F283PC (FSC)
TTL 4-BIT BINARY FULL ADDER
— TOP VIEW —

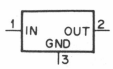




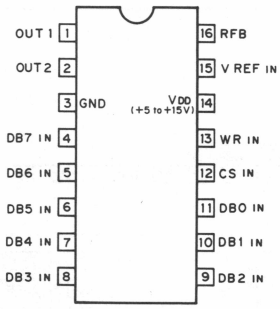
	2^4	2^3	2^2	2^1	2^0	
					CI	CARRY IN
		A3	A2	A1	A0	DATA A IN
+		B3	B2	B1	B0	DATA B IN
	CO	Σ3	Σ2	Σ1	Σ0	CARRY & SUM OUT
EX.					1	CI
		1	0	1	1	A
+		1	0	1	0	B
	1	0	1	1	0	OUTPUTS
	CO	Σ3	Σ2	Σ1	Σ0	

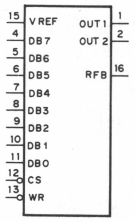
AD580MH (ANALOG DEVICES)
REFERENCE VOLTAGE GENERATOR (2.5V)
— BOTTOM VIEW —

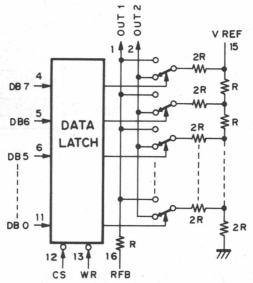




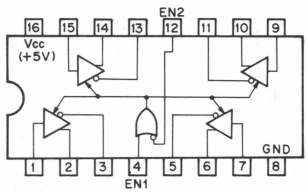
AD7524JN (ANALOG DEVICES)
C-MOS 8-BIT BUFFERED MULTIPLYING D/A CONVERTOR
— TOP VIEW —







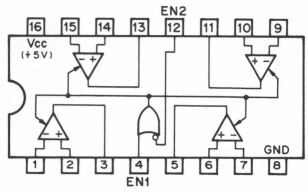
AM26LS31CN (TI)
AM26LS31PC (ADVANCED MICRO DEVICE)
HIGH SPEED DIFFERENTIAL LINE DRIVER
— TOP VIEW —



FUNCTION TABLE		
EN2	EN1	OUTPUT
0	0	ENABLE
0	1	ENABLE
1	0	HI-Z
1	1	ENABLE

0 ; LOW LEVEL
1 ; HIGH LEVEL
HI-Z ; HIGH IMPEDANCE

AM26LS32AC (TI)
AM26LS32PC (ADVANCED MICRO DEVICES)
HIGH SPEED DIFFERENTIAL LINE RECEIVER
— TOP VIEW —

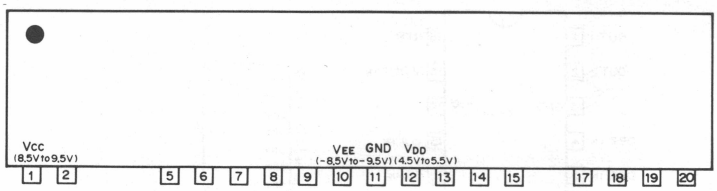


FUNCTION TABLE		
EN2	EN1	OUTPUT
0	0	ENABLE
0	1	ENABLE
1	0	HI-Z
1	1	ENABLE

0 ; LOW LEVEL
1 ; HIGH LEVEL
HI-Z ; HIGH IMPEDANCE

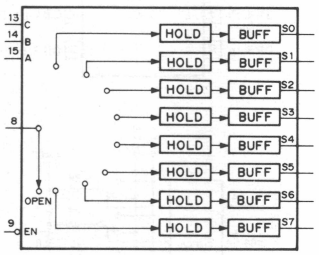
	SENSE	INPUT VOLT
LS32	±200mV	±7V
LS33	±500mV	±15V

BX1412 (SONY)
8-CHANNEL SELECTABLE SAMPLE HOLDER
— PRINTED SIDE —

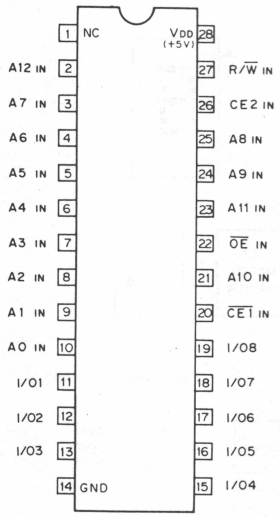


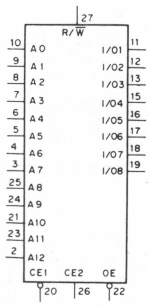
EN	C	B	A	"ON" CHANNEL
0	0	0	0	S0
0	0	0	1	S1
0	0	1	0	S2
0	0	1	1	S3
0	1	0	0	S4
0	1	0	1	S5
0	1	1	0	S6
0	1	1	1	S7
1	X	X	X	OPEN

0; LOW LEVEL
1; HIGH LEVEL
X; DON'T CARE



CXK5864PN-15L (SONY) (ACCESS TIME = 150 nS)
C-MOS 8192 WORDx8-BIT RAM
— TOP VIEW —



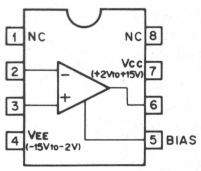


A0–12 ; ADDRESS INPUTS
CE1,2 ; CHIP ENABLE INPUTS
OE ; OUTPUT ENABLE INPUT
I/O1–8 ; DATA INPUTS/OUTPUTS
R/W ; READ/WRITE INPUT

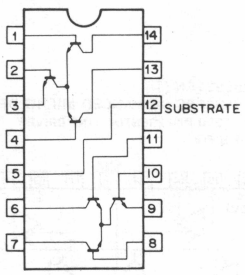
MODE	$\overline{CE1}$	CE2	$\overline{OE}$	R/$\overline{W}$	I/O1~8
READ	0	1	0	1	DATA OUTPUTS
WRITE	0	1	X	0	DATA INPUTS
OUTPUT DESELECT	0	1	1	1	HI-Z
STANDBY	1	X	X	X	HI-Z
	X	0	X	X	HI-Z

0; LOW LEVEL
1; HIGH LEVEL
X; DON'T CARE
HI-Z; HIGH IMPEDANCE

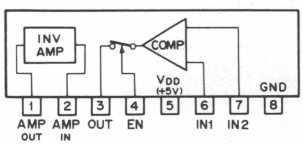
CA3080E (RCA)
OPERATIONAL AMPLIFIER
— TOP VIEW —



CA3102E-S (RCA)
HIGH FREQ.DIFFERNTIAL AMPLIFIER
— TOP VIEW —



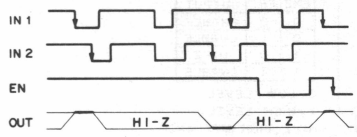
CX23065 (SONY)
N-MOS PHASE COMPARATOR WITH INVERSION AMPLIFIER
— PRINTED SIDE VIEW —



EN	OUT
1	ACTIVE
0	HIGH IMPEDANCE

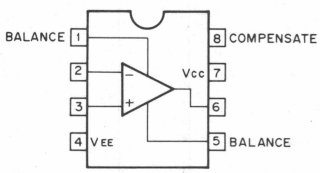
1; HIGH LEVEL
0; LOW LEVEL

TIMMING CHART

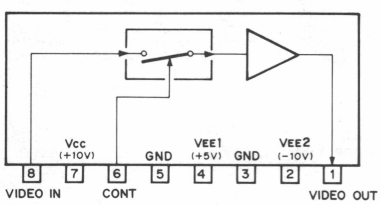


HI-Z ; HI-IMPEDANCE

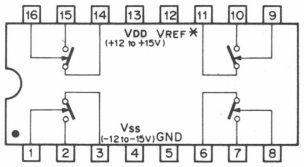
HA3-2525-5 (HARRIS)
OPERATIONAL AMPLIFIER
— TOP VIEW —



HDS01 (SOSHIN)
VIDEO AMPLIFIER AND RF SWITCHER
— REAR VIEW —



HI1-0201-5 (HARRIS)
C-MOS ANALOG SWITCH
— TOP VIEW —



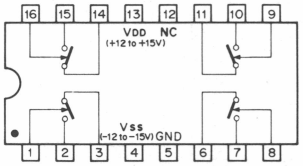
CONT IN	SW
0	
1	

0 ; LOW LEVEL
1 ; HIGH LEVEL

*NOTE

INTERFACIAL DEVICE		VREF CONNECTION
TTL		Open
C-MOS	VDD ≦ 5.5V	Open
	VDD > 5.5V	To VDD of interfacial IC

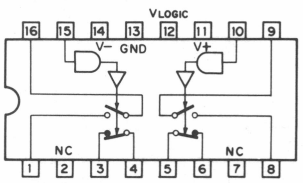
HI1-201HS (HARRIS)
C-MOS HIGH SPEED ANALOG SWITCH
— TOP VIEW —



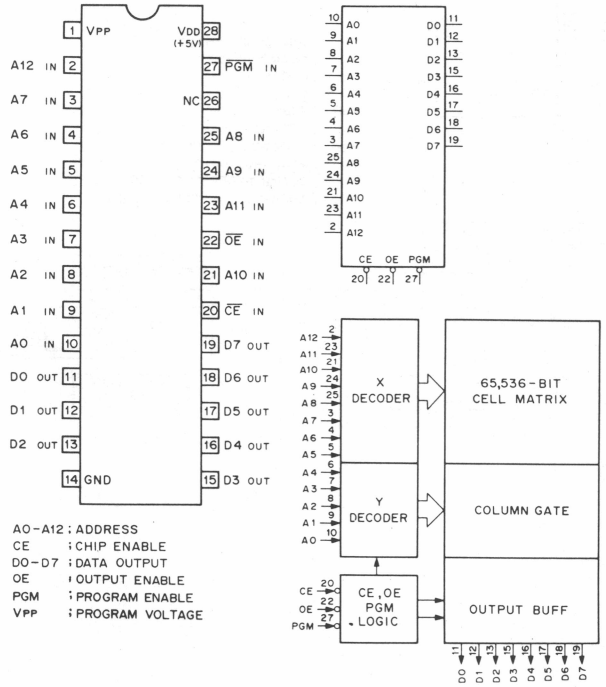
CONT IN	SW
0	
1	

0 ; LOW LEVEL
1 ; HIGH LEVEL

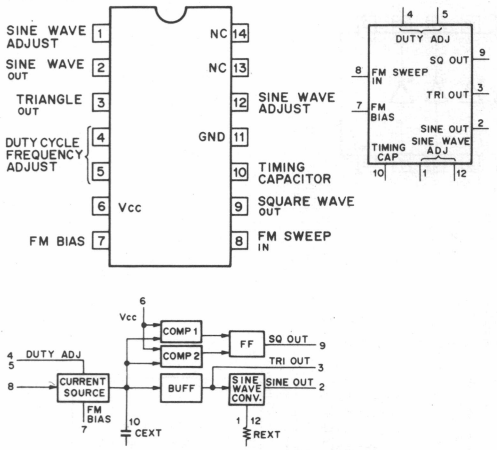
HI-5043-5 (HARRIS)
C-MOS ANALOG SWITCH
— TOP VIEW —



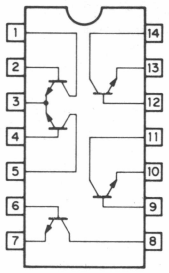
HN27C64G-20 (HITACHI) (ACCESS TIME = 200 nS)
C-MOS 64K (8K-8) ERASABLE PROM WITH 3-STATE OUTPUTS
— TOP VIEW —



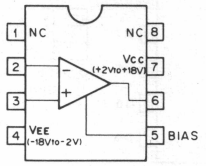
ICL8038BCJD (INTERSIL)
PRECISION WAVEFORM GENERATOR
VOLTAGE CONTROLLED OSCILLATOR
— TOP VIEW —



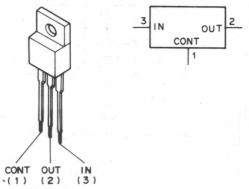
LM3046N (NSC)
NPN TRANSISTOR ARRAY
— TOP VIEW —



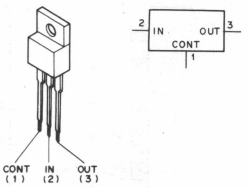
LM3080N (RCA)
OPERATIONAL AMPLIFIER
— TOP VIEW —



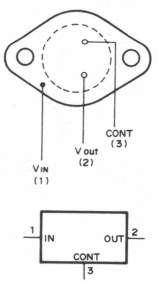
LM317T (NSC)
3-TERMINAL ADJUSTABLE REGULATOR



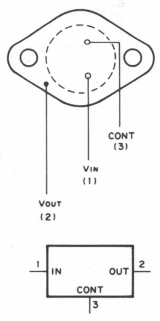
LM337T (NSC)
3-TERMINAL ADJUSTABLE REGULATOR NEGATIVE



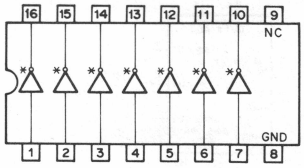
LT1033CK (LINEAR TECHNOLOGY)
NEGATIVE ADJUSTABLE REGULATOR (3A)
— BOTTOM VIEW —



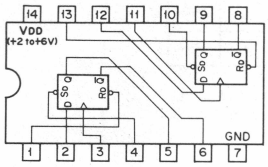
LT350AK (LINEAR TECHNOLOGY)
POSITIVE ADJUSTABLE REGULATOR (3A)
— BOTTOM VIEW —



M54517P (MITSUBISHI)
INVERTER WITH OPEN-COLLECTOR
(DARLINGTON-CONNECTED TRANSISTOR ARRAY)
— TOP VIEW —



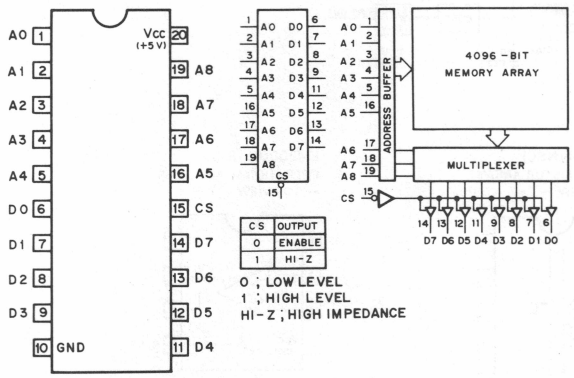
MC74HC74N (MOTOROLA)
TC74HC74F (TOSHIBA) FLAT PACKAGE
C-MOS D-TYPE FLIP FLOP WITH DIRECT SET/RESET
— TOP VIEW —



INPUTS				OUTPUTS	
$\overline{S_D}$	$\overline{R_D}$	CK	D	Qn+1	$\overline{Qn+1}$
0	1	X	X	1	0
1	0	X	X	0	1
0	0	X	X	1*	1*
1	1	↑	1	1	0
1	1	↑	0	0	1
1	1	0	X	Qn	$\overline{Qn}$

0 ; LOW LEVEL
1 ; HIGH LEVEL
X ; DON'T CARE
1* ; NONSTABLE

MB7124 (FUJITSU)
MB7124EZ (FUJITSU)
MB7124HZ (FUJITSU)
4096-BIT (512x8) PROM WITH 3-STATE OUTPUT
— TOP VIEW —

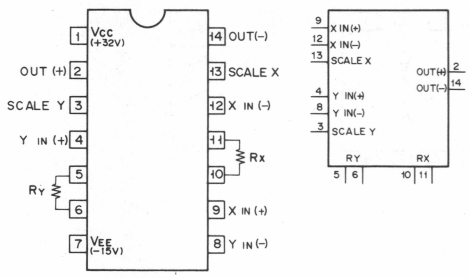


CS	OUTPUT
0	ENABLE
1	HI-Z

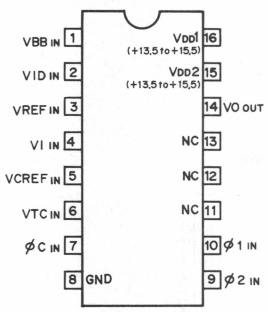
0 ; LOW LEVEL
1 ; HIGH LEVEL
HI-Z ; HIGH IMPEDANCE

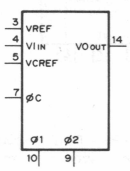
A0 - A8 ; ADDRESS INPUTS
D0 - D7 ; DATA OUTPUTS
CS ; CHIP SELECT INPUT

MC1595L (MOTOROLA)
LINEAR MULTIPLIER
— TOP VIEW —

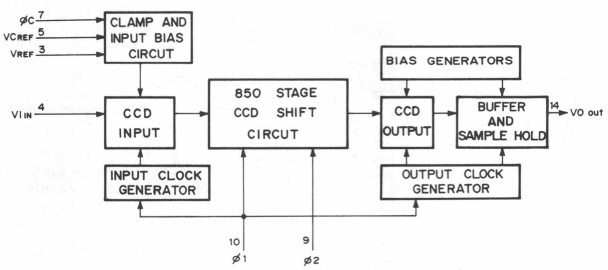


MS1002-3 (PLESSEY)
CCD 850 ELEMENT ANALOGUE STORE
— TOP VIEW —

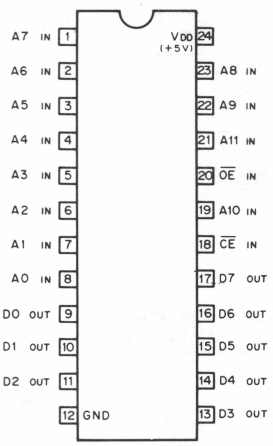


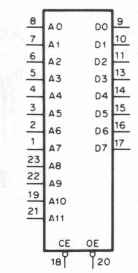


VO ; ANALOGUE OUTPUT
ØC ; CLAMP PULSE
Ø1 ; CLOCK 1
Ø2 ; CLOCK 2
VBB ; SUBSTRATE BIAS
VID ; INTERNAL DIODE BIAS
VREF ; REFERENCE INPUT
VI ; ANALOGUE INPUT
VCREF ; CLAMP REFERENCE BIAS
VTC ; THERMAL COMPENSATION BIAS



MBM27C32A-25 (FUJITSU) (ACCESS TIME = 250 nS)
C-MOS 32K (4Kx8) UV EPROM
— TOP VIEW —

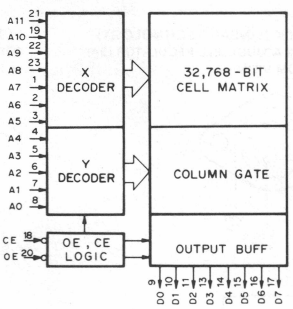




IN		OUT	FUNCTION
CE	OE	Dn	
0	0	DENTERED	READ
1	X	HIGH Z	STANDBY

0 ; LOW LEVEL
1 ; HIGH LEVEL
X ; DON'T CARE
HIGH Z ; HIGH IMPEDANCE

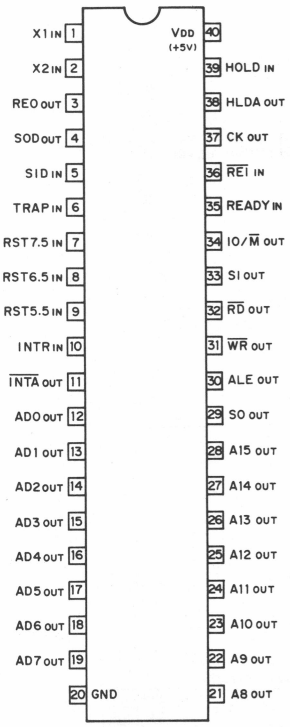
A0 - A11 ; ADDRESS
CE ; CHIP ENABLE
OE ; OUTPUT ENABLE
D0 - D7 ; DATA OUTPUTS

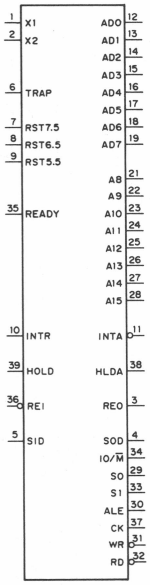


MSM80C85A-2RS (OKI)

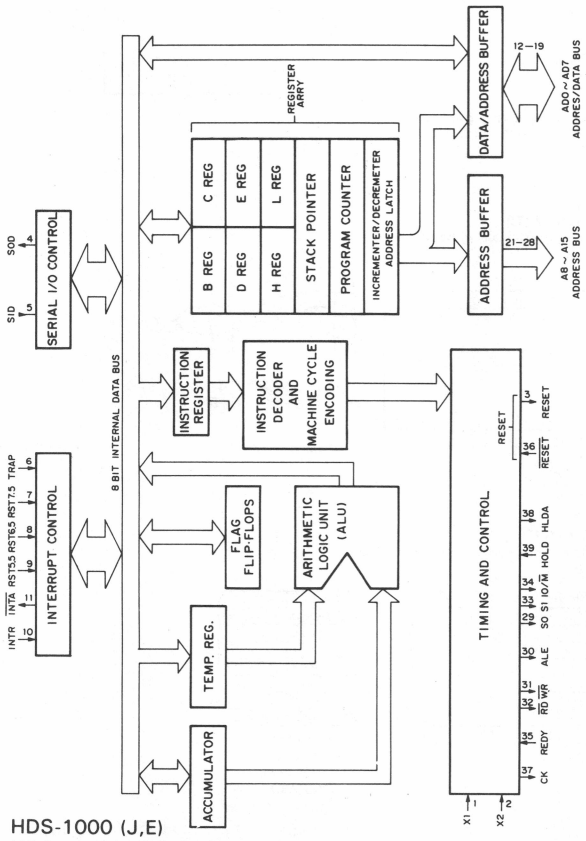
C-MOS 1 CHIP 8-BIT MICROPROCESSOR

— TOP VIEW —





X1,2 ; CRYSTAL INPUT
A8~A15 ; ADDRESS BUS
AD0~AD7 ; MALTIPLEXED ADDRES/DATA BUS
ALE ; ADDRESS LUTCH ENABLE
WR ; WRITE CONTROL
RD ; READ CONTROL
INTR ; INTERRUPT REQUEST
RST7.5,6.5,5.5 ; RESTART INTERRUPT
SO, SI, IO/M ; MACHINE CYCLE STATUS
TRAP ; TRAP INTERRUPT INPUT
READY ; READY SIGNAL INPUT
SID ; SERIAL INPUT DATA LINE
SOD ; SERIAL OUTPUT DATA LINE
REI ; RESET INPUT
REO ; RESET OUTPUT
HOLA ; HOLD ACKNOWLEDGE
INTA ; INTERRUPT ACKNOWLEDGE

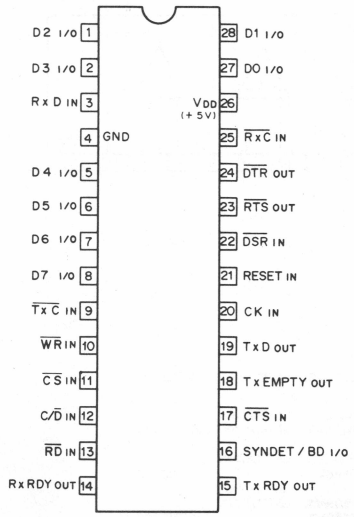


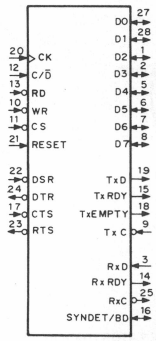
HDS-1000 (J,E)
HDS-1000T (J,E)

MSM82C51ARS (OKI)

C-MOS PROGRAMMABLE COMMUNICATION INTERFACE

— TOP VIEW —

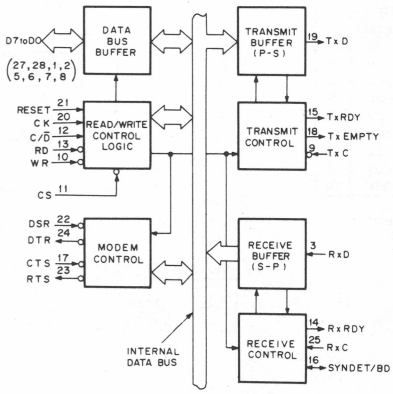




OPERATION WITH CPU

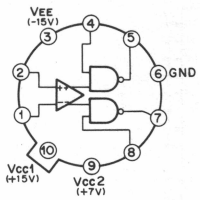
$\overline{CS}$	C/$\overline{D}$	$\overline{RD}$	$\overline{WR}$	FUNCTION
1	X	X	X	DATA BUS 3-STATE
0	X	1	1	DATA BUS 3-STATE
0	1	0	1	STATUS TO CPU
0	1	1	0	CONTROL WORD FROM CPU
0	0	0	1	DATA TO CPU
0	0	1	0	DATA FROM CPU

1 ; HIGH LEVEL
0 ; LOW LEVEL
X ; DON'T CARE
HI-Z ; HIGH IMPEDANCE

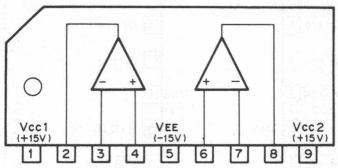


CK; CLOCK SIGNAL
CS; CHIP ENABLE
CTS; CLEAR TO SEND DATA
C/D; DATA,COMMAND WORD or STATUS WORD IS TO BE WRITTEN or READ
D0 TO D7; DATA
DSR; DATA SET READY
DTR; DATA TERMINAL READY
RD; READ DATA or STATUS WORD
RESET; RESET BY HIGH LEVEL
RTS; REQUEST TO SEND DATA
RxC; RECEIVING CLOCK
RxD; RECEIVING DATA
RxRDY; RECEIVING READY
SYNDET/BD; SYNC DETECT/BREAK DETECT
TxC; TRANSMITTING CLOCK
TxD; TRANSMITTING DATA
TxEMPTY; TRANSMITTING CHARACTER EMPTY
TxRDY; TRANSMITTING READY
WR; WRITE DATA or CONTROL WORD

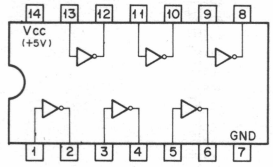
NE527H (SIGNETICS)
VOLTAGE COMPARATOR
— BOTTOM VIEW —

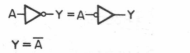


NJM4558S (JRC)
HIGH PERFORMANCE DUAL OPERATIONAL AMPLIFIER
— SIDE VIEW —



SN74ALS04AN (TI)
SN74LS04N (TI)
SN74S04N (TI)
TTL INVERTER
— TOP VIEW —



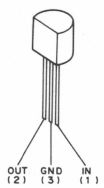


$Y = \overline{A}$

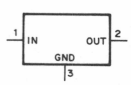
A	Y
0	1
1	0

0; LOW LEVEL
1; HIGH LEVEL

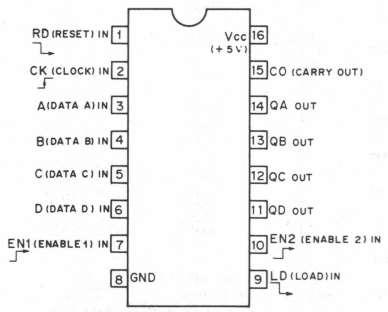
NJM78L ? ?A (NEC)
POSITIVE VOLTAGE REGULATOR (100mA)

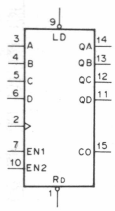


OUTPUT VOLTAGE	NJM78L??A	uA78L??ACL	uA78L??AWV	uPC78L??J
2.6V	NJM78L02A	uA78L02ACL	uA78L26AWV	
5V	NJM78L05A	uA78L05ACL	uA78L05AWV	uPC78L05J
6V	NJM78L06A			
6.2V		uA78L06ACL	uA78L62AWV	
8V	NJM78L08A	uA78L08ACL		uPC78L08J
8.2V			uA78L82AWV	
9V	NJM78L09A	uA78L09ACL	uA78L09AWV	
10V		uA78L10ACL		uPC78L10J
12V	NJM78L12A	uA78L12ACL	uA78L12AWV	uPC78L12J
15V	NJM78L15A	uA78L15ACL	uA78L15AWV	uPC78L15J
18V	NJM78L18A		uA78L18AWV	
20V	NJM78L20A			
24V	NJM78L24A		uA78L24AWV	



SN74ALS163BN (TI)
TTL PRESETTABLE SYNCHRONOUS 4-BIT BINARY COUNTER
— TOP VIEW —





MODE SELECTION

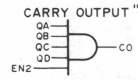
CONTROL INPUTS				MODE
RD	LD	EN1	EN2	
0	X	X	X	RESET (SYNCHRONOUS)
1	0	X	X	PRESET (SYNCHRONOUS)
1	1	0	X	NO COUNT
1	1	X	0	NO COUNT
1	1	1	1	COUNT

0; LOW LEVEL
1; HIGH LEVEL
X; DON'T CARE

COUNT SEQUENCE

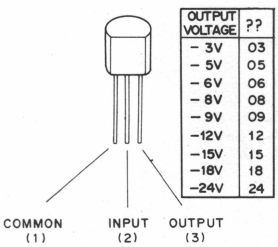
COUNT	OUTPUTS			
	QD	QC	QB	QA
0	0	0	0	0
1	0	0	0	1
2	0	0	1	0
3	0	0	1	1
4	0	1	0	0
5	0	1	0	1
6	0	1	1	0
7	0	1	1	1
8	1	0	0	0
9	1	0	0	1
10	1	0	1	0
11	1	0	1	1
12	1	1	0	0
13	1	1	0	1
14	1	1	1	0
15	1	1	1	1

CARRY OUTPUT "CO"

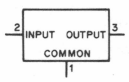


CO IS HIGH WHEN EN2 INPUT IS HIGH AND COUNT IS "15".

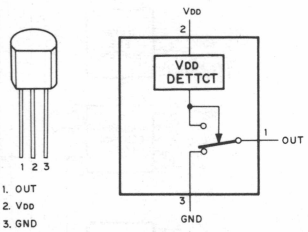
NJM79L ? ?A (JRC)
NEGATIVE VOLTAGE REGULATOR (100mA)
— FRONT VIEW —



OUTPUT VOLTAGE	??
−3V	03
−5V	05
−6V	06
−8V	08
−9V	09
−12V	12
−15V	15
−18V	18
−24V	24



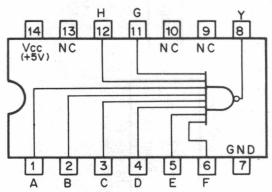
S8054ALB (DAINI SEIKOSHA)
C-MOS VOLTAGE DETECTOR
— FRONT VIEW —

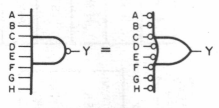


VDD DETTCT SELECTION

VDD	OUT
VDD > 4.305V	VDD
VDD < 3.995V	GND

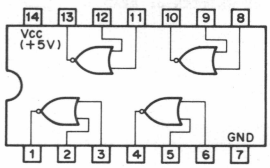
SN74ALS30AN (TI)
TTL 8-INPUT POSITIVE-NAND GATE
— TOP VIEW —

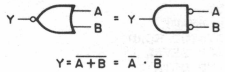




$Y = \overline{A \cdot B \cdot C \cdot D \cdot E \cdot F \cdot G \cdot H}$
$= \overline{A} + \overline{B} + \overline{C} + \cdots + \overline{H}$

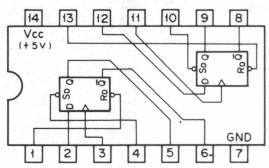
SN74128N (TI)
TTL 50-OHM LINE DRIVER
— TOP VIEW —





$Y = \overline{A+B} = \overline{A} \cdot \overline{B}$

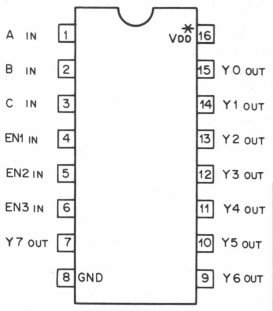
SN74ALS74AN (TI)
TTL D-TYPE FLIP FLOP WITH DIRECT SET/RESET
— TOP VIEW —

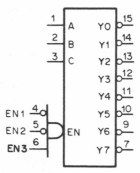


INPUTS				OUTPUTS	
$\overline{S_D}$	$\overline{R_D}$	CK	D	Qn+1	$\overline{Q_{n+1}}$
0	1	X	X	1	0
1	0	X	X	0	1
0	0	X	X	1*	1*
1	1	↑	1	1	0
1	1	↑	0	0	1
1	1	0	X	Qn	$\overline{Q_n}$

0; LOW LEVEL
1; HIGH LEVEL
X; DON'T CARE
1*; NONSTABLE

SN74HC138N (TI)
TC74HC138P (TOSHIBA)
C-MOS 3-TO-8 LINE DECODER/DEMULTIPLEXER
— TOP VIEW —





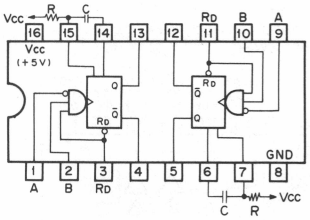
* VDD HC ; +2 to +6V
HCT; +5V

INPUT				OUTPUT							
EN	C	B	A	Y7	Y6	Y5	Y4	Y3	Y2	Y1	Y0
0	X	X	X	1	1	1	1	1	1	1	1
1	0	0	0	1	1	1	1	1	1	1	0
1	0	0	1	1	1	1	1	1	1	0	1
1	0	1	0	1	1	1	1	1	0	1	1
1	0	1	1	1	1	1	1	0	1	1	1
1	1	0	0	1	1	1	0	1	1	1	1
1	1	0	1	1	1	0	1	1	1	1	1
1	1	1	0	1	0	1	1	1	1	1	1
1	1	1	1	0	1	1	1	1	1	1	1

EN = $\overline{EN1} \cdot \overline{EN2} \cdot EN3$

0 ; LOW LEVEL
1 ; HIGH LEVEL
X ; DON'T CARE

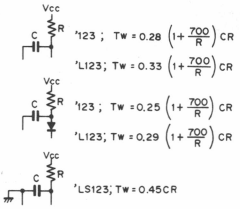
SN74LS123N (TI)
TTL RETRIGGERABLE MONOSTABLE MULTIVIBRATOR WITH DIRECT RESET
— TOP VIEW —



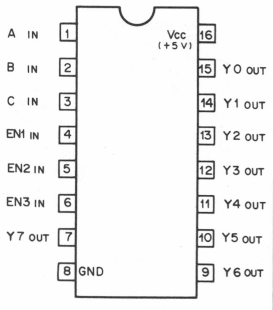
INPUTS			OUTPUTS	
RD	A	B	Q	$\overline{Q}$
0	X	X	0	1
X	1	X	0	1
X	X	0	0	1
1	0	↓	⊓	⊔
1	↓	1	⊓	⊔
↑	0	1	⊓	⊔

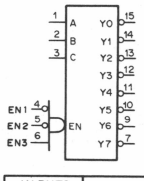
0; LOW LEVEL
1; HIGH LEVEL
X; DON'T CARE

OUTPUT PULSE WIDTH



SN74LS138N (TI)
TTL 3-TO-8-LINE DECODER/DEMULTIPLEXER
— TOP VIEW —



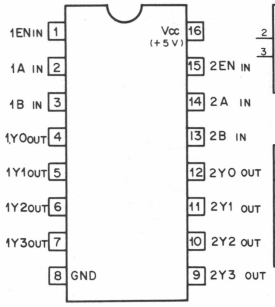


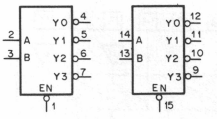
INPUTS				OUTPUTS							
EN	C	B	A	Y7	Y6	Y5	Y4	Y3	Y2	Y1	Y0
0	X	X	X	1	1	1	1	1	1	1	1
1	0	0	0	1	1	1	1	1	1	1	0
1	0	0	1	1	1	1	1	1	1	0	1
1	0	1	0	1	1	1	1	1	0	1	1
1	0	1	1	1	1	1	1	0	1	1	1
1	1	0	0	1	1	1	0	1	1	1	1
1	1	0	1	1	1	0	1	1	1	1	1
1	1	1	0	1	0	1	1	1	1	1	1
1	1	1	1	0	1	1	1	1	1	1	1

EN = $\overline{EN1} \cdot \overline{EN2} \cdot EN3$

0 ; LOW LEVEL
1 ; HIGH LEVEL
X ; DON'T CARE

SN74LS139N (TI)
TTL 2-TO-4-LINE DECODER/DEMULTIPLEXER
— TOP VIEW —

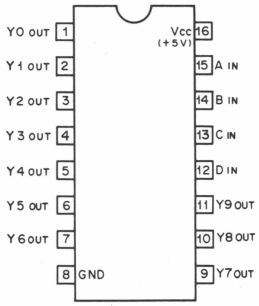


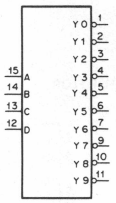


INPUTS			OUTPUTS			
EN	B	A	Y3	Y2	Y1	Y0
0	0	0	1	1	1	0
0	0	1	1	1	0	1
0	1	0	1	0	1	1
0	1	1	0	1	1	1
1	X	X	1	1	1	1

0 ; LOW LEVEL
1 ; HIGH LEVEL
X ; DON'T CARE

SN74LS145N (TI)
TTL BCD-TO-DECIMAL DECODER/DRIVER
— TOP VIEW —

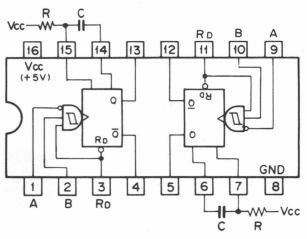




STATE	INPUTS				OUTPUTS									
	D	C	B	A	Y0	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9
0	0	0	0	0	0	1	1	1	1	1	1	1	1	1
1	0	0	0	1	1	0	1	1	1	1	1	1	1	1
2	0	0	1	0	1	1	0	1	1	1	1	1	1	1
3	0	0	1	1	1	1	1	0	1	1	1	1	1	1
4	0	1	0	0	1	1	1	1	0	1	1	1	1	1
5	0	1	0	1	1	1	1	1	1	0	1	1	1	1
6	0	1	1	0	1	1	1	1	1	1	0	1	1	1
7	0	1	1	1	1	1	1	1	1	1	1	0	1	1
8	1	0	0	0	1	1	1	1	1	1	1	1	0	1
9	1	0	0	1	1	1	1	1	1	1	1	1	1	0
INVALID	1	0	1	0	1	1	1	1	1	1	1	1	1	1
	1	0	1	1	1	1	1	1	1	1	1	1	1	1
	1	1	0	0	1	1	1	1	1	1	1	1	1	1
	1	1	0	1	1	1	1	1	1	1	1	1	1	1
	1	1	1	0	1	1	1	1	1	1	1	1	1	1
	1	1	1	1	1	1	1	1	1	1	1	1	1	1

0; LOW LEVEL
1; HIGH LEVEL

SN74LS221N (TI)
TTL MONOSTABLE MULTIVIBRATOR WITH SCHMITT TRIGGER INPUT
— TOP VIEW —



INPUTS			OUTPUTS	
RD	A	B	Q	$\overline{Q}$
0	X	X	0	1
X	1	X	0	1
X	X	0	0	1
1	0	↑	⊓	⊔
1	↓	1	⊓	⊔
↑	0	1	⊓	⊔

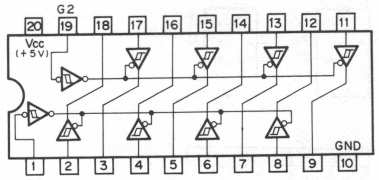
0; LOW LEVEL
1; HIGH LEVEL
X; DON'T CARE

OUTPUT PULSE WIDTH = 0.7CR

SN74LS244N (TI)

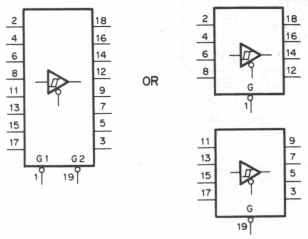
TTL 3-STATE SCHMITT TRIGGER BUFFER/DRIVER

— TOP VIEW —



G	A	Y
0	0	0
0	1	1
1	X	HI-Z

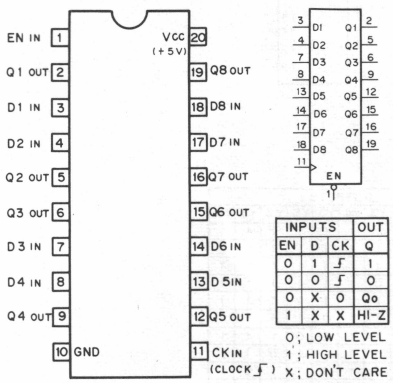
0; LOW LEVEL
1; HIGH LEVEL
X; DON'T CARE
HI-Z; HIGH IMPEDANCE



SN74LS374N (TI)

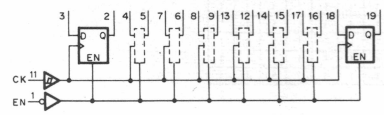
TTL 3-STATE OUTPUTS OCTAL D-TYPE FLIP-FLOP

— TOP VIEW —



INPUTS			OUT
EN	D	CK	Q
0	1	↓	1
0	0	↓	0
0	X	0	Qo
1	X	X	HI-Z

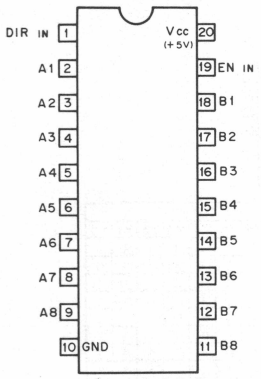
0; LOW LEVEL
1; HIGH LEVEL
X; DON'T CARE
HI-Z; HIGH IMPEDANCE



SN74LS641N (TI)

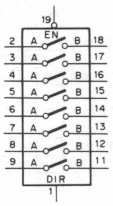
TTL BILATERAL SCHMITT TRIGGER BUS TRANSCEIVERS WITH 3-STATE OUTPUT

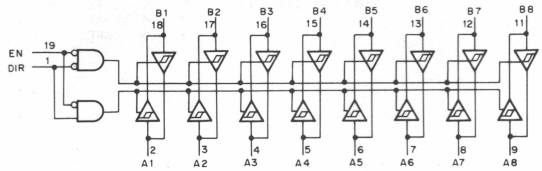
— TOP VIEW —



EN	DIR	OPERATION
0	0	B to A
0	1	A to B
1	X	HI-Z

0; LOW LEVEL
1; HIGH LEVEL
X; DON'T CARE.
HI-Z; HIGH IMPEDANCE

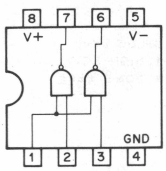




SN75150P (TI)

DUAL LINE DRIVER

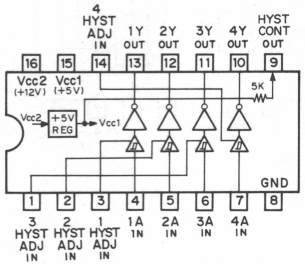
— TOP VIEW —



SN75154N (TI)

QUADRUPLE LINE RECEIVER

— TOP VIEW —



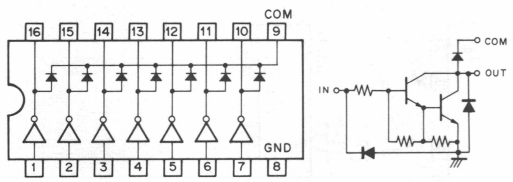
MODE SELECTION

Vcc2	Vcc1	HYST ADJ	HYST CONT	MODE
+12V	HYST ADJ	Vcc1(+5V)	OPEN	NORMAL
+12V	OPEN	OPEN	OPEN	FAIL SAFE
+12V	OPEN	HYST CONT	HYST ADJ	NORMAL
OPEN	+5V	Vcc1	OPEN	NORMAL
OPEN	+5V	OPEN	OPEN	FAIL SAFE
OPEN	+5V	OPEN	Vcc1	NORMAL

SN75468N (TI)

DARLINGTON TRANSISTOR ARRAY

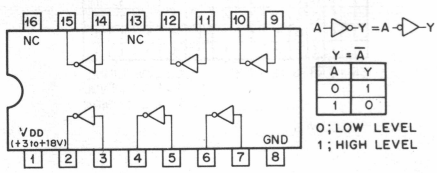
— TOP VIEW —



TC4049BP (TOSHIBA)

C-MOS INVERTING TYPE BUFFER/CONVERTER

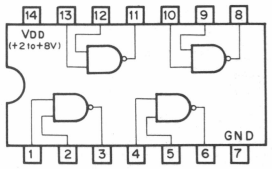
— TOP VIEW —

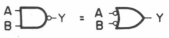


A	Y
0	1
1	0

0; LOW LEVEL
1; HIGH LEVEL

TC40H000P (TOSHIBA)
C-MOS 2-INPUT NAND GATE
— TOP VIEW —



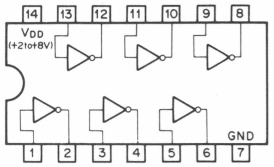


$Y = \overline{A \cdot B} = \bar{A} + \bar{B}$

A	B	Y
0	0	1
0	1	1
1	0	1
1	1	0

0; LOW LEVEL
1; HIGH LEVEL

TC40H004P (TOSHIBA)
C-MOS INVERTER
— TOP VIEW —

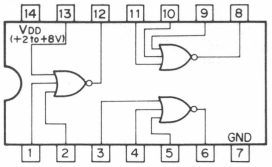


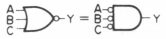
$Y = \bar{A}$

A	Y
0	1
1	0

0; LOW LEVEL
1; HIGH LEVEL

TC40H027P (TOSHIBA)
C-MOS 3-INPUT POSITIVE-NOR GATE
— TOP VIEW —



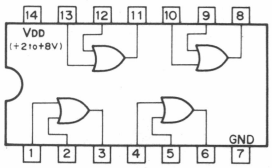


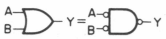
$Y = \overline{A+B+C} = \bar{A} \cdot \bar{B} \cdot \bar{C}$

A	B	C	Y
0	0	0	1
0	0	1	0
0	1	0	0
0	1	1	0
1	0	0	0
1	0	1	0
1	1	0	0
1	1	1	0

0; LOW LEVEL
1; HIGH LEVEL

TC40H032P (TOSHIBA)
C-MOS 2-INPUT POSITIVE-OR GATE
— TOP VIEW —



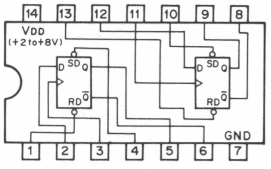


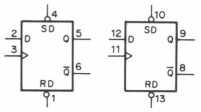
$Y = A + B = \overline{\bar{A} \cdot \bar{B}}$

A	B	Y
0	0	0
0	1	1
1	0	1
1	1	1

0; LOW LEVEL
1; HIGH LEVEL

TC40H074P (TOSHIBA)
C-MOS HIGH SPEED D-TYPE FLIP-FLOP WITH DIRECT SET/RESET
— TOP VIEW —





D - MODE

tn	tn + 1
D	Q	$\bar{Q}$
0	0	1
1	1	0

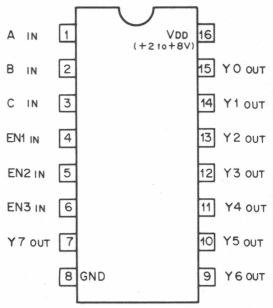
R-S MODE

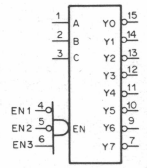
INPUT		OUTPUT	
RD	SD	Q	$\bar{Q}$
0	0	1	1
0	1	0	1
1	0	1	0
1	1	D-MODE	

0; LOW LEVEL
1; HIGH LEVEL

HDS-1000 (J,E)
HDS-1000T (J,E)

TC40H138P (TOSHIBA)
C-MOS 3-TO-8-LINE DECODER/DEMULTIPLEXER
— TOP VIEW —



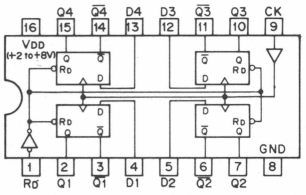


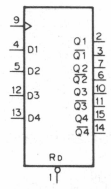
INPUTS				OUTPUTS							
EN	C	B	A	Y7	Y6	Y5	Y4	Y3	Y2	Y1	Y0
0	X	X	X	1	1	1	1	1	1	1	1
1	0	0	0	1	1	1	1	1	1	1	0
1	0	0	1	1	1	1	1	1	1	0	1
1	0	1	0	1	1	1	1	1	0	1	1
1	0	1	1	1	1	1	1	0	1	1	1
1	1	0	0	1	1	1	0	1	1	1	1
1	1	0	1	1	1	0	1	1	1	1	1
1	1	1	0	1	0	1	1	1	1	1	1
1	1	1	1	0	1	1	1	1	1	1	1

$EN = \overline{EN1} \cdot \overline{EN2} \cdot EN3$

0; LOW LEVEL
1; HIGH LEVEL
X; DON'T CARE

TC40H175P (TOSHIBA)
C-MOS D-TYPE FLIP-FLOP WITH CLEAR
— TOP VIEW —

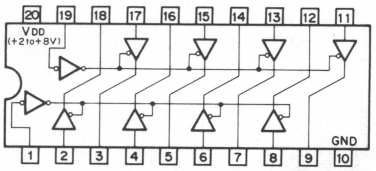




RD	CK	D	Q	$\bar{Q}$
0	X	X	0	1
1	↓	1	1	0
1	↓	0	0	1
1	0	X	Qo	$\bar{Q}o$

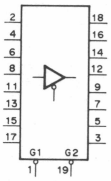
0; LOW LEVEL
1; HIGH LEVEL
X; DON'T CARE

TC40H244P (TOSHIBA)
C-MOS 3-STATE BUFFER/DRIVER
— TOP VIEW —

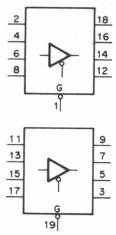


G	A	Y
0	0	0
0	1	1
1	X	HI-Z

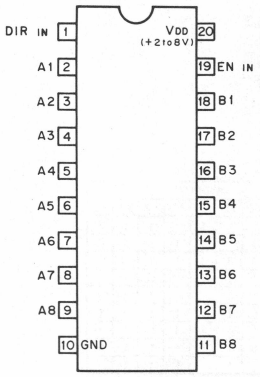
0; LOW LEVEL
1; HIGH LEVEL
X; DON'T CARE
HI-Z; HIGH IMPEDANCE



OR

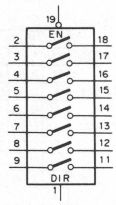


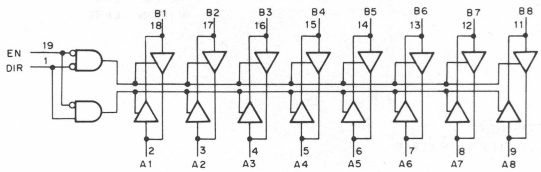
TC40H245P (TOSHIBA)
C-MOS BILATERAL BUS TRANSCEIVERS WITH 3-STATE OUTPUT
— TOP VIEW —



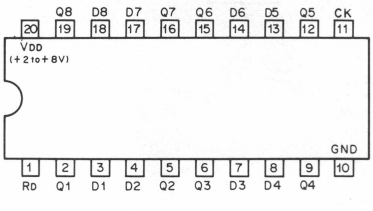
EN	DIR	OPERATION
0	0	B to A
0	1	A to B
1	X	HI-Z

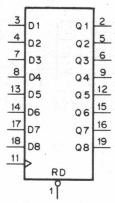
0 ; LOW LEVEL
1 ; HIGH LEVEL
X ; DON'T CARE.





TC40H273P (TOSHIBA)
C-MOS D-TYPE FLIP-FLOP WITH DIRECT RESET
— TOP VIEW —

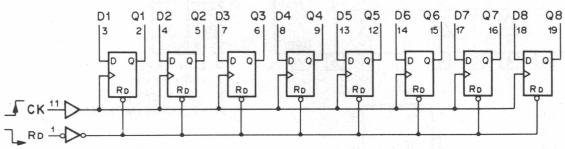




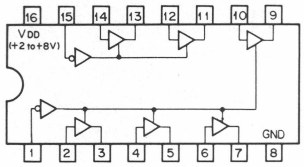
EACH FLIP-FLOP

INPUTS			OUT
RD	CK	D	Q
0	X	X	0
1	↓	0	0
1	↓	1	1
1	0	X	Q0

0 ; LOW LEVEL
1 ; HIGH LEVEL
X ; DON'T CARE

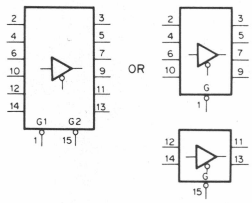


TC40H367P (TOSHIBA)
C-MOS BUS DRIVER WITH 3-STATE OUTPUTS
— TOP VIEW —

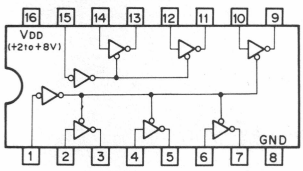


G	A	Y
0	0	0
0	1	1
1	X	HI-Z

0 ; LOW LEVEL
1 ; HIGH LEVEL
X ; DON'T CARE
HI-Z ; HIGH IMPEDANCE

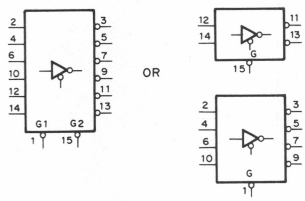


TC40H368P (TOSHIBA)
C-MOS INVERTING 3-STATE BUFFER
— TOP VIEW —

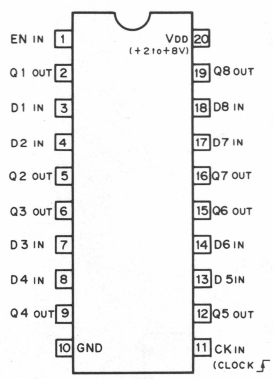


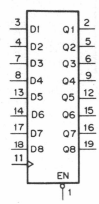
G	A	Y
0	0	1
0	1	0
1	X	HI-Z

0 ; LOW LEVEL
1 ; HIGH LEVEL
X ; DON'T CARE
HI-Z ; HIGH IMPEDANCE



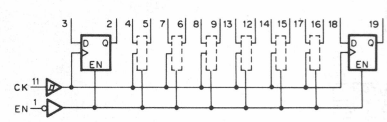
TC40H374P (TOSHIBA)
C-MOS 3-STATE OUTPUTS OCTAL D-TYPE FLIP-FLOP
— TOP VIEW —



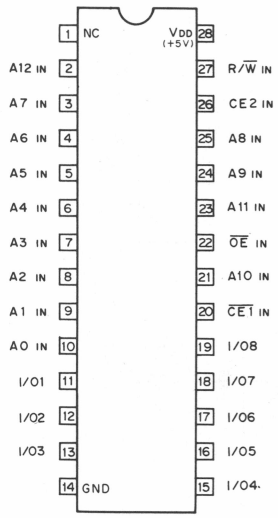


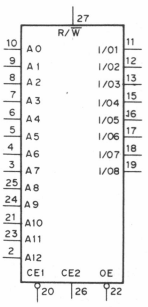
INPUTS			OUT
EN	D	CK	Q
0	1	↓	1
0	0	↓	0
0	X	0	Q0
1	X	X	HI-Z

0 ; LOW LEVEL
1 ; HIGH LEVEL
X ; DON'T CARE
HI-Z ; HIGH IMPEDANCE



TC5564PL-15 (TOSHIBA) (ACCESS TIME = 150 nS)
C-MOS 8192 WORDx8-BIT RAM
— TOP VIEW —

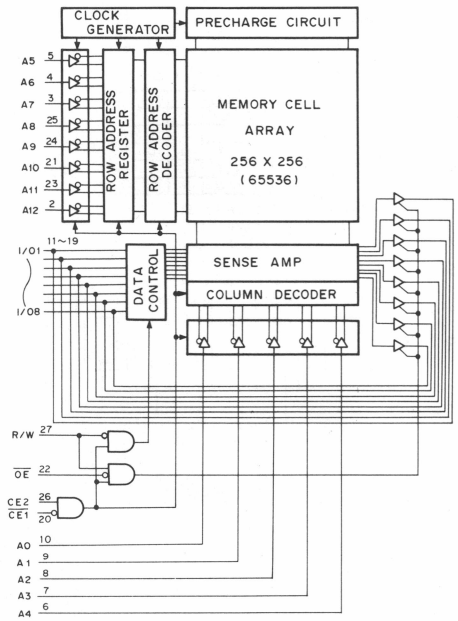




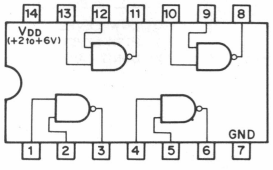
A0–12 ; ADDRESS INPUTS
CE1,2 ; CHIP ENABLE INPUTS
OE ; OUTPUT ENABLE INPUT
I/O1–8 ; DATA INPUTS/OUTPUTS
R/W ; READ/WRITE INPUT

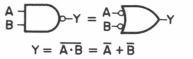
MODE	$\overline{CE1}$	CE2	$\overline{OE}$	R/$\overline{W}$	I/O1~8
READ	0	1	0	1	DATA OUTPUTS
WRITE	0	1	X	0	DATA INPUTS
OUTPUT DESELECT	X	X	1	X	HI-Z
STANDBY	1	X	X	X	HI-Z
	X	0	X	X	HI-Z

0 ; LOW LEVEL
1 ; HIGH LEVEL
X ; DON'T CARE
HI-Z ; HIGH IMPEDANCE



TC74HC00P (TOSHIBA)
C-MOS 2-INPUT NAND GATE
— TOP VIEW —

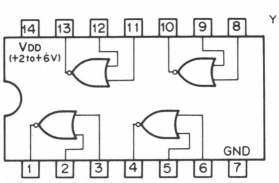


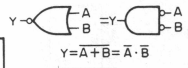


A	B	Y
0	0	1
0	1	1
1	0	1
1	1	0

0 ; LOW LEVEL
1 ; HIGH LEVEL

TC74HC02P (TOSHIBA)
C MOS 2-INPUT POSITIVE-NOR GATE
— TOP VIEW —

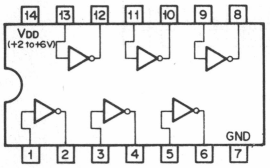


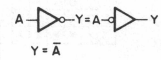


A	B	Y
0	0	1
0	1	0
1	0	0
1	1	0

0 ; LOW LEVEL
1 ; HIGH LEVEL

TC74HC04F (TOSHIBA) FLAT PACKAGE
TC74HC04P (TOSHIBA)
C-MOS INVERTER
— TOP VIEW —

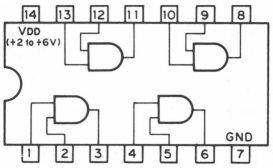


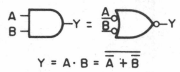


A	Y
0	1
1	0

0 ; LOW LEVEL
1 ; HIGH LEVEL

TC74HC08P (TOSHIBA)
C-MOS 2-INPUT AND GATE
— TOP VIEW —

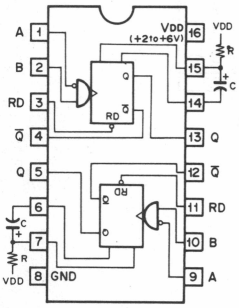




A	B	Y
0	0	0
0	1	0
1	0	0
1	1	1

0 ; LOW LEVEL
1 ; HIGH LEVEL

TC74HC123P (TOSHIBA)
C-MOS DUAL RETRIGGERABLE MONOSTABLE MULTIVIBRATOR
— TOP VIEW —

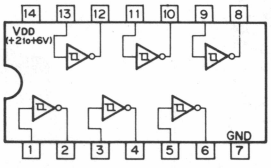


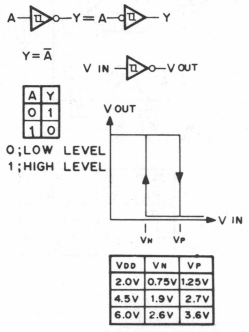
INPUT			OUTPUT	
RD	A	B	Q	Q̄
0	X	X	0	1
1	1	X	0	1
1	X	0	0	1
1	0	↑	⊓	⊔
1	↓	1	⊓	⊔
↓	0	1	⊓	⊔

0 ; LOW LEVEL
1 ; HIGH LEVEL
X ; DON'T CARE

OUTPUT PULSE WIDTH = 0.46CR

TC74HC14P (TOSHIBA)
C-MOS SCHMITT TRIGGER INVERTER
— TOP VIEW —





A	Y
0	1
1	0

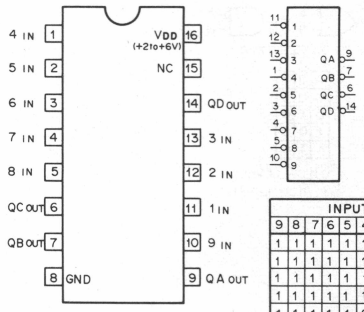
0 ; LOW LEVEL
1 ; HIGH LEVEL

VDD	VN	VP
2.0V	0.75V	1.25V
4.5V	1.9V	2.7V
6.0V	2.6V	3.6V

TC74HC147P (TOSHIBA)

C-MOS 10-TO-4-LINE PRIORITY ENCODER

— TOP VIEW —



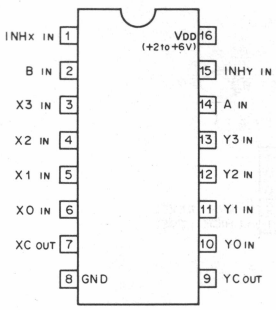
INPUT								OUTPUT			
9	8	7	6	5	4	3	2	1	QD	QC	QB	QA
1	1	1	1	1	1	1	1	1	1	1	1	1
1	1	1	1	1	1	1	1	0	1	1	1	0
1	1	1	1	1	1	1	0	X	1	1	0	1
1	1	1	1	1	1	0	X	X	1	1	0	0
1	1	1	1	1	0	X	X	X	1	0	1	1
1	1	1	1	0	X	X	X	X	1	0	1	0
1	1	1	0	X	X	X	X	X	1	0	0	1
1	1	0	X	X	X	X	X	X	1	0	0	0
1	0	X	X	X	X	X	X	X	0	1	1	1
0	X	X	X	X	X	X	X	X	0	1	1	0

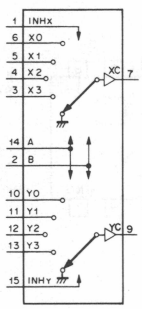
0 ; LOW LEVEL
1 ; HIGH LEVEL
X ; DON'T CARE

TC74HC153F (TOSHIBA) FLAT PACKAGE

C-MOS 4-LINE-TO-1-LINE DATA SELECTOR/MULTIPLEXER

— TOP VIEW —





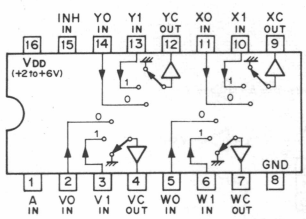
CONTROL IN			ON CHANNEL
INH	B	A	
0	0	0	0
0	0	1	1
0	1	0	2
0	1	1	3
1	X	X	GND

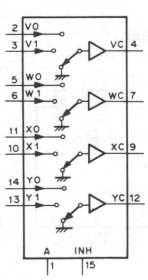
0 ; LOW LEVEL
1 ; HIGH LEVEL
X ; DON'T CARE

TC74HC157P (TOSHIBA)

C-MOS 2-LINE-TO-1-LINE DATA SELECTOR/MULTIPLEXER

— TOP VIEW —





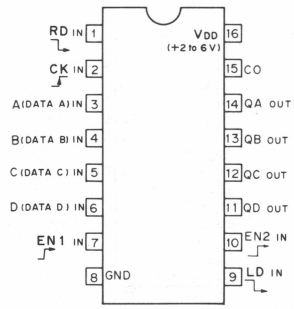
CONT. IN		ON CHANNEL
INH	A	
0	0	0
0	1	1
1	X	GND

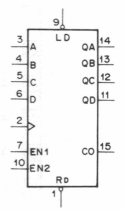
0 ; LOW LEVEL
1 ; HIGH LEVEL
X ; DON'T CARE

TC74HC163P (TOSHIBA)

C-MOS PRESETTABLE SYNCHRONOUS 4-BIT BINARY COUNTER

— TOP VIEW —





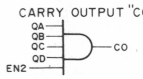
MODE SELECTION

CONTROL INPUTS				MODE
RD	LD	EN1	EN2	
0	X	X	X	RESET (SYNCHRONOUS)
1	0	X	X	PRESET (SYNCHRONOUS)
1	1	0	X	NO COUNT
1	1	X	0	NO COUNT
1	1	1	1	COUNT

COUNT SEQUENCE

COUNT	OUTPUTS			
	QD	QC	QB	QA
0	0	0	0	0
1	0	0	0	1
2	0	0	1	0
3	0	0	1	1
4	0	1	0	0
5	0	1	0	1
6	0	1	1	0
7	0	1	1	1
8	1	0	0	0
9	1	0	0	1
10	1	0	1	0
11	1	0	1	1
12	1	1	0	0
13	1	1	0	1
14	1	1	1	0
15	1	1	1	1

CARRY OUTPUT "CO"

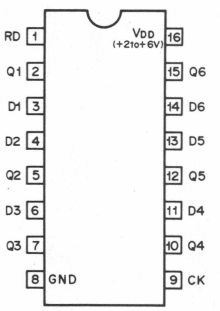


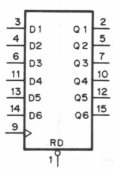
CO IS HIGH WHEN EN2 INPUT IS HIGH AND COUNT IS "15".

TC74HC174F (TOSHIBA) FLAT PACKAGE

C-MOS D-TYPE FLIP-FLOP WITH RESET

— TOP VIEW —

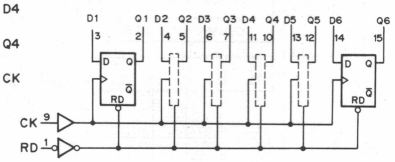




EACH FLIP-FLOP

INPUT			OUT
RD	CK	D	Q
0	X	X	0
1	↓	0	0
1	↓	1	1
1	0	X	Q0

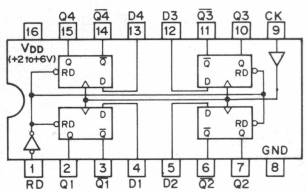
0 ; LOW LEVEL
1 ; HIGH LEVEL
X ; DON'T CARE

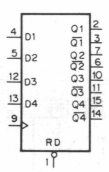


TC74HC175P (TOSHIBA)

C-MOS D-TYPE FLIP-FLOP WITH RESET

— TOP VIEW —

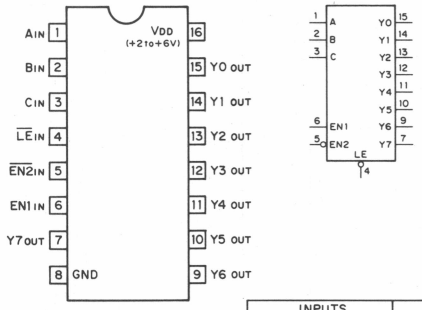




RD	CK	D	Q	$\overline{Q}$
0	X	X	0	1
1	↓	1	1	0
1	↓	0	0	1
1	0	X	Q0	$\overline{Q0}$

0 ; LOW LEVEL
1 ; HIGH LEVEL
X ; DON'T CARE

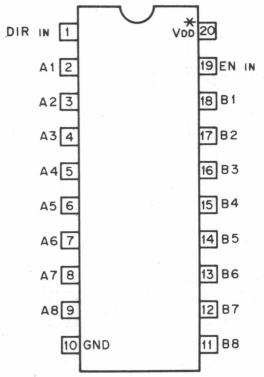
TC74HC237P (TOSHIBA)
C-MOS 3-TO-8 LINE DECODER/LATCH
— TOP VIEW —

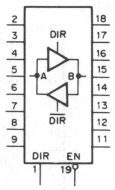


INPUTS						OUTPUTS							
ENABLE			SELECT										
LE	EN2	EN1	C	B	A	Y7	Y6	Y5	Y4	Y3	Y2	Y1	Y0
X	X	0	X	X	X	0	0	0	0	0	0	0	0
X	1	X	X	X	X	0	0	0	0	0	0	0	0
0	0	1	0	0	0	0	0	0	0	0	0	0	1
0	0	1	0	0	1	0	0	0	0	0	0	1	0
0	0	1	0	1	0	0	0	0	0	0	1	0	0
0	0	1	0	1	1	0	0	0	0	1	0	0	0
0	0	1	1	0	0	0	0	0	1	0	0	0	0
0	0	1	1	0	1	0	0	1	0	0	0	0	0
0	0	1	1	1	0	0	1	0	0	0	0	0	0
0	0	1	1	1	1	1	0	0	0	0	0	0	0
1	0	1	X	X	X	HOLD							

1 ; HIGH LEVEL
0 ; LOW LEVEL
X ; DON'T CARE

TC74HC245P (TOSHIBA)
C-MOS BILATERAL BUS TRANSCEIVERS WITH 3-STATE OUTPUT
— TOP VIEW —

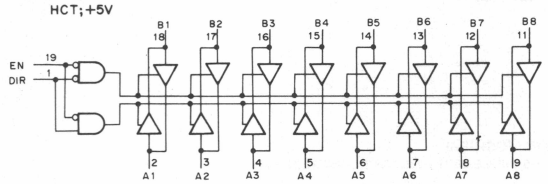




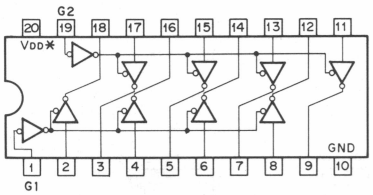
EN	DIR	OPERATION
0	0	B to A
0	1	A to B
1	X	HI-Z

0 ; LOW LEVEL
1 ; HIGH LEVEL
X ; DON'T CARE
HI-Z ; HIGH IMPEDANCE

* VDD HC ; +2 to +6V
HCT ; +5V



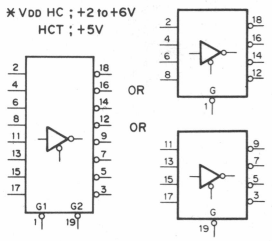
TC74HC240P (TOSHIBA)
C-MOS 3-STATE INVERTER/LINE DRIVER
— TOP VIEW —



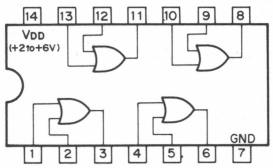
G	A	Y
0	0	1
0	1	0
1	X	HI-Z

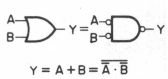
0 ; LOW LEVEL
1 ; HIGH LEVEL
X ; DON'T CARE
HI-Z ; HIGH IMPEDANCE

* VDD HC ; +2 to +6V
HCT ; +5V



TC74HC32P (TOSHIBA)
C-MOS 2-INPUT OR GATE
— TOP VIEW —

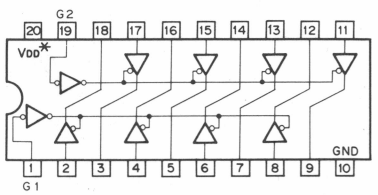


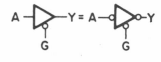


A	B	Y
0	0	0
0	1	1
1	0	1
1	1	1

0 ; LOW LEVEL
1 ; HIGH LEVEL

TC74HC244F (TOSHIBA) FLAT PACKAGE
TC74HC244P (TOSHIBA)
C-MOS BUS BUFFER WITH 3-STATE OUTPUT
— TOP VIEW —

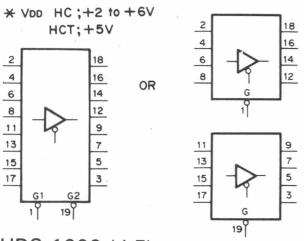




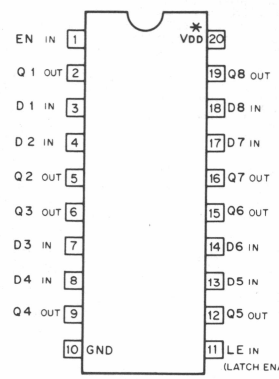
G	A	Y
0	0	0
0	1	1
1	X	HI-Z

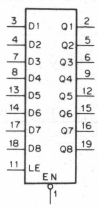
0 ; LOW LEVEL
1 ; HIGH LEVEL
X ; DON'T CARE
HI-Z ; HIGH IMPEDANCE

* VDD HC ; +2 to +6V
HCT ; +5V



TC74HC373P (TOSHIBA)
C-MOS 3-STATE OUTPUTS OCTAL LATCHES
— TOP VIEW —

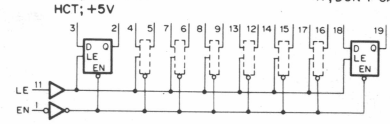




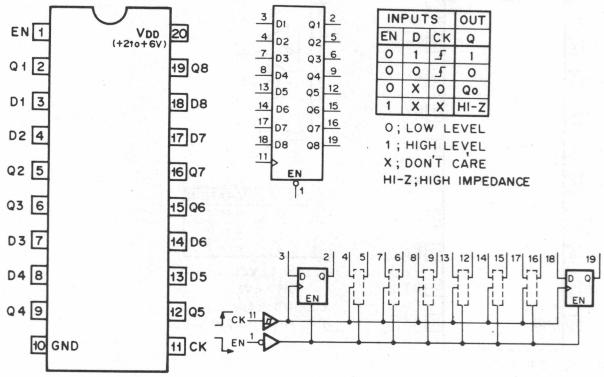
INPUTS			OUT
EN	D	LE	Q
0	1	1	1
0	0	1	0
0	X	0	Qo
1	X	X	HI-Z

HI-Z ;
HIGH IMPEDANCE
0 ; LOW LEVEL
1 ; HIGH LEVEL
X ; DON'T CARE

* VDD HC ; +2 to +6V
HCT ; +5V



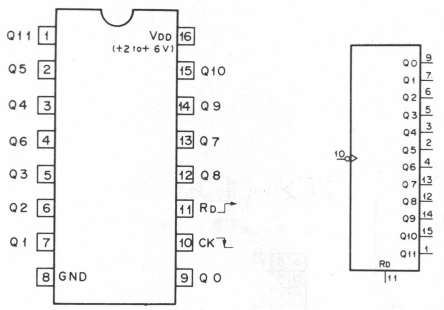
TC74HC374F (TOSHIBA) FLAT PACKAGE
TC74HC374P (TOSHIBA)
C-MOS 3-STATE OCTAL D-TYPE FLIP-FLOP
— TOP VIEW —



INPUTS			OUT
EN	D	CK	Q
0	1	↑	1
0	0	↑	0
0	X	0	Q0
1	X	X	HI-Z

0 ; LOW LEVEL
1 ; HIGH LEVEL
X ; DON'T CARE
HI-Z ; HIGH IMPEDANCE

TC74HC4040P (TOSHIBA)
C-MOS 12-STAGE RIPPLE CARRY BINARY COUNTER/DRIVER
— TOP VIEW —

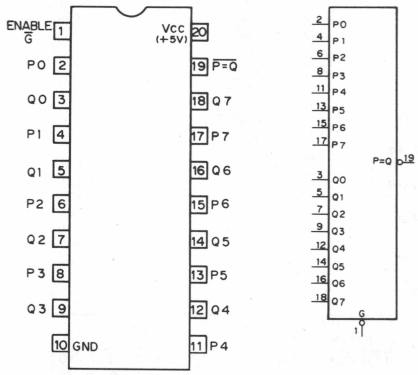


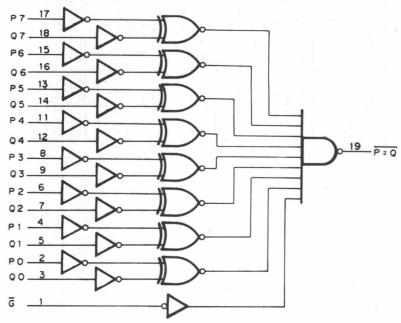
COUNT	Q11	Q10	Q9	Q8	Q7	Q6	Q5	Q4	Q3	Q2	Q1	Q0
0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0	0	0	0	1
2	0	0	0	0	0	0	0	0	0	0	1	0
3	0	0	0	0	0	0	0	0	0	0	1	1
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
4095	1	1	1	1	1	1	1	1	1	1	1	1

RD	Q11 ····· Q0
1	ALL LOW
0	COUNT

0 ; LOW LEVEL
1 ; HIGH LEVEL

TC74HC688P (TOSHIBA)
C-MOS 8-BIT MAGNITUDE COMPARATOR

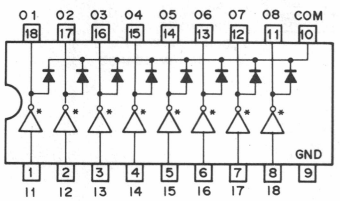


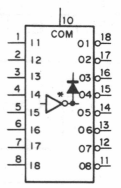


INPUTS		OUTPUT
P , Q	G	P = Q
P=Q	0	0
P>Q	0	1
P<Q	0	1
X	1	1

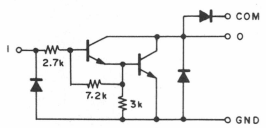
0 ; LOW LEVEL
1 ; HIGH LEVEL
X ; DON'T CARE

TD62083AP (TOSHIBA)
DARLINGTON DRIVER
— TOP VIEW —

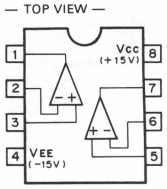




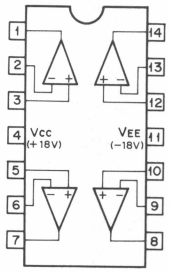
*; OPEN COLLECTOR



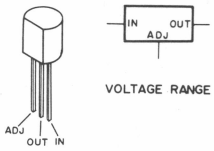
TL082CP (TI)
uPC4082C (NEC)
OPERATIONAL AMPLIFIER
(J FET-INPUT)
— TOP VIEW —



TL084CN (TI)
OPERATIONAL AMPLIFIER
(J FET-INPUT)
— TOP VIEW —

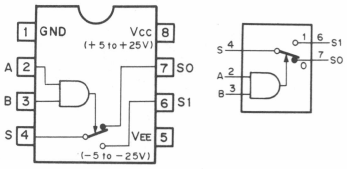


TL317LP (TI)
3-TERMINAL ADJUSTABLE REGULATOR



VOLTAGE RANGE ; 1.2 to 32V

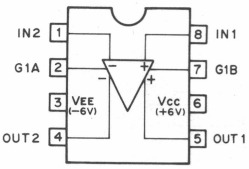
TL601CP (TI)
P-MOS ANALOG SWITCH
— TOP VIEW —



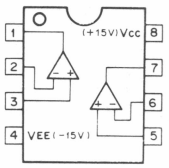
CONT IN		ON CHANNEL
A	B	
0	0	SO
0	1	SO
1	0	SO
1	1	S1

0 ; LOW LEVEL
1 ; HIGH LEVEL

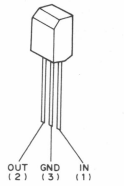
uPC1663C (NEC)
WIDEBAND VIDEO AMPLIFIER
— TOP VIEW —



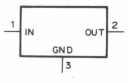
uPC4558C (NEC)
OPERATIONAL AMPLIFIER
— TOP VIEW —



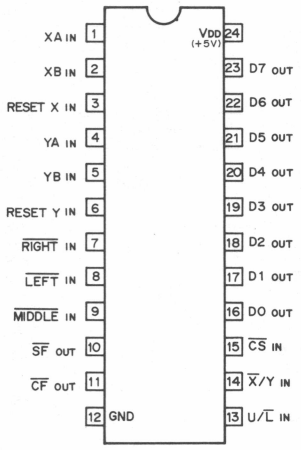
uPC78L??A (NEC)
POSITIVE VOLTAGE REGULATOR (100mA)

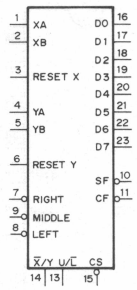


OUTPUT VOLTAGE	uPC78L??	uPC78L??A
5V	uPC78L05	uPC78L05A
8V	uPC78L08	
12V	uPC78L12	
15V	uPC78L15	

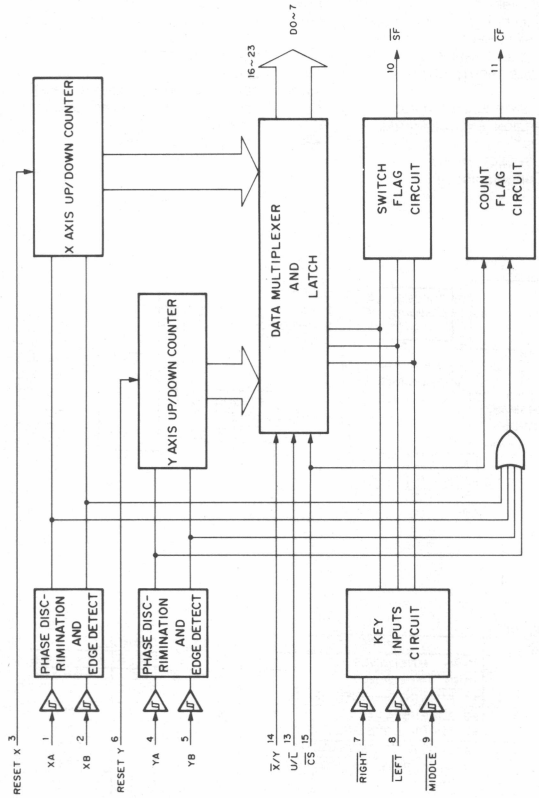


uPD4701AC (NEC)
C-MOS INCREMENTAL ROTARY ENCODER
— TOP VIEW —



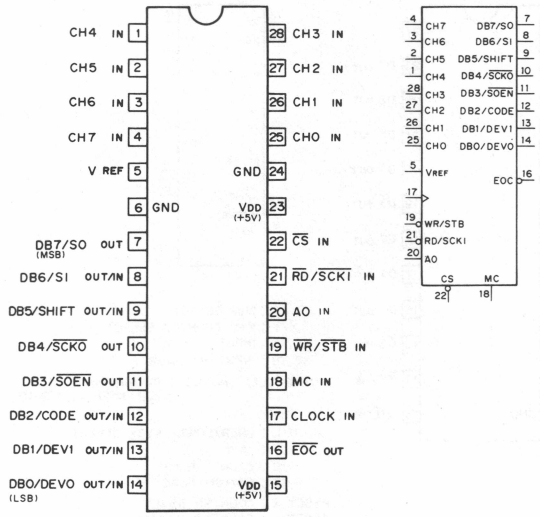


CS ; CHIP SELECT
X/Y ; X/Y COUNTER SELECT
XA,YA ; INPUT A PHASE
XB,YB ; INPUT B PHASE
RIGHT, LEFT, MIDDLE ; SWITCH INPUT FOR INTERNAL STATUS
U/L ; UPER/LOWER BYTE SELECT
DO~D7 ; DATA
CF ; COUNT FLAG
SF ; SWITCH FLAG
RESET X ; COUNTER RESET
RESET Y ; COUNTER RESET

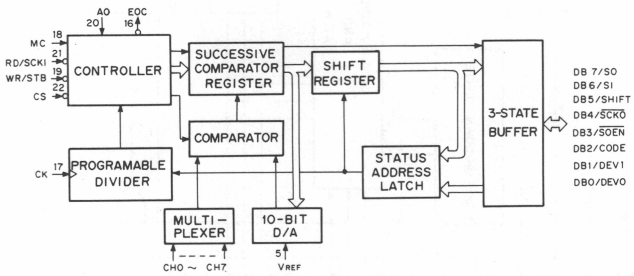


HDS-1000 (J,E)
HDS-1000T (J,E)

uPD7004C (NEC)
C-MOS 10-BIT SUCCESSIVE COMPARATOR TYPE A/D CONVERTER
— TOP VIEW —



AO ; CONTROL ADDRESS INPUT
CHO~7 ; ANALOG INPUT
CODE ; CODE SELECT (2'S COMPLEMENT/ BINARY) INPUT
CS ; CHIP SELECT INPUT
DBO~7 ; DATA BUS INPUT/OUTPUT
DEVO, DEV1 ; CLOCK RATE SELECT INPUT
EOC ; CONVERSION ENDING SIGNAL OUTPUT
MC ; MODE SELECT INPUT
RD ; READ SIGNAL INPUT
SCKI ; SERIAL CLOCK INPUT
SCKO ; SERIAL CLOCK OUTPUT
SHIFT ; SHIFT SELECT (LSB FIRST/ MSB FIRST)
SI ; SERIAL INPUT
SO ; SERIAL OUTPUT
SOEN ; SERIAL OUTPUT ENABLE OUTPUT
STB ; ADDRESS WRITE STROBE SIGNAL INPUT
WR ; WRITE SIGNAL INPUT



MC	MODE
0	SERIAL
1	PARALLEL

PARALLEL MODE

CS	WR	RD	AO	MODE
1	X	X	X	HIGH IMPEDANCE
0	1	1	X	HIGH IMPEDANCE
0	0	1	0	*1 ANALOG CHANNEL SELECT
0	0	1	1	*2 CODE SELECT/ *3 CLOCK RATE SELECT
0	1	0	0	*4 LOW-BYTE DATA OUTPUT
0	1	0	1	*4 HIGH-BYTE DATA OUTPUT
0	0	0	X	INHIBIT

0 ; LOW LEVEL X : DON'T CARE
1 ; HIGH LEVEL

*1 ANALOG CHANNEL

SEL2	SEL1	SELO	MPX CHAN.
0	0	0	CHO
0	0	1	CH1
0	1	0	CH2
0	1	1	CH3
1	0	0	CH4
1	0	1	CH5
1	1	0	CH6
1	1	1	CH7

*2 CODE SELECT

CODE	CODE SELECT
0	BINARY DATA
1	2'S COMPLEMENT DATA

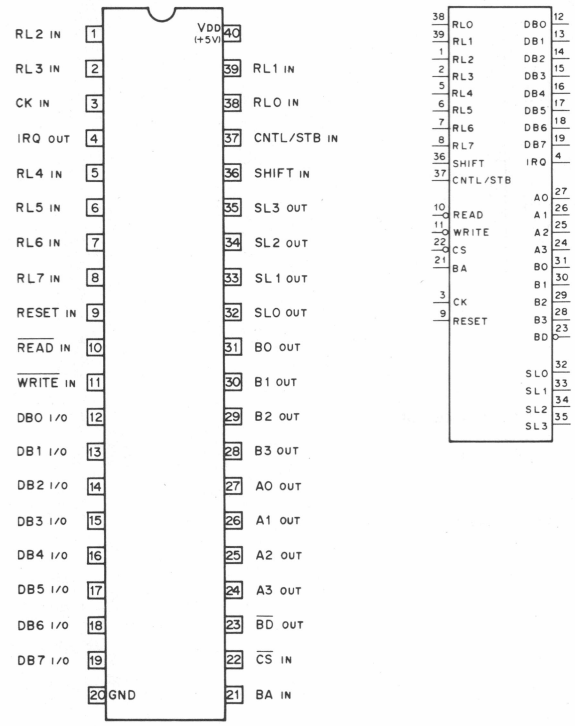
*3 CLOCK RATE SELECT

DEV1	DEV 0	CLOCK RATE
0	0	1
0	1	1/2
1	0	1/4
1	1	1/8

*4 LOW/HIGH-BYTE DATA

	DB7	DB 6	DB5	DB4	DB3	DB2	DB1	DB 0
HIGH-BYTE	MSB	2ND	3RD	4TH	5TH	6TH	7TH	8TH
LOW- BYTE	9TH	0	0	0	0	0	0	0

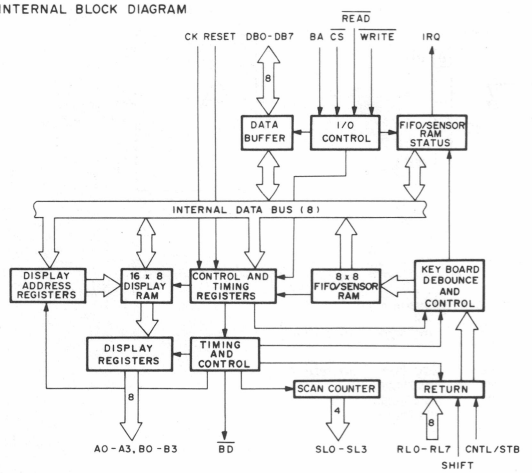
uPD8279C-5 (NEC)
N-MOS PROGRAMMABLE KEYBOARD/DISPLAY CONTROLLER
— TOP VIEW —



PIN NAMES

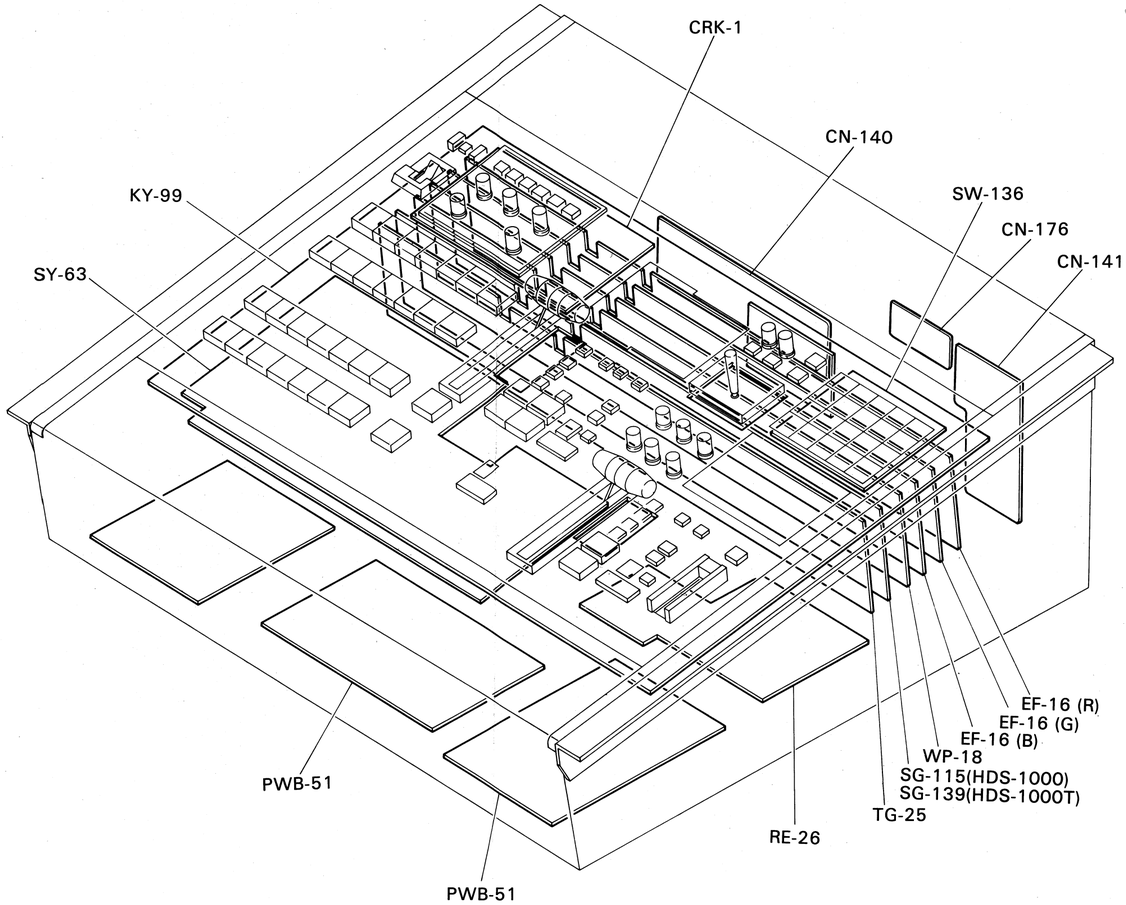
CK ; CLOCK
RESET ; RESET
$\overline{CS}$; CHIP SELECT
$\overline{READ}$; READ
$\overline{WRITE}$; WRITE
BA ; BUFFER ADDRESS
IRQ ; INTERRUPT REQUEST
SLO-SL3 ; SCAN LINES
RLO-RL7 ; RETURN LINES
SHIFT ; SHIFT
CNTL/STB ; CONTROL/STROBE
AO-A3 ; DISPLAY(A) OUTPUT
BO-B3 ; DISPLAY(B) OUTPUT
$\overline{BD}$; BLANK DISPLAY OUTPUT
DBO-DB7 ; DATA BUS

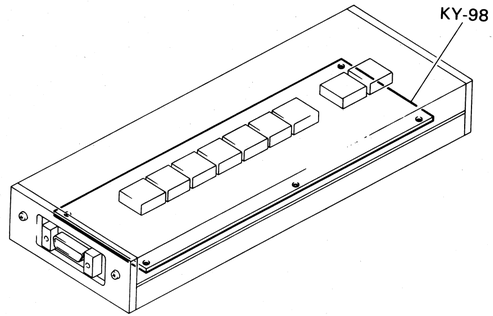
INTERNAL BLOCK DIAGRAM



BOARD LAYOUT

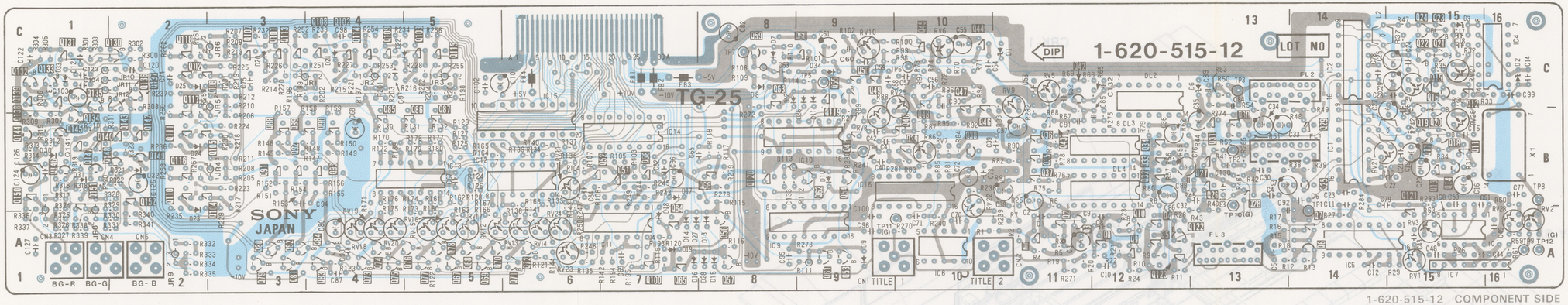
SECTION C
SCHAMATIC DIAGRAMS AND BOARD ILLUSTRATIONS
BOARD LAYOUT



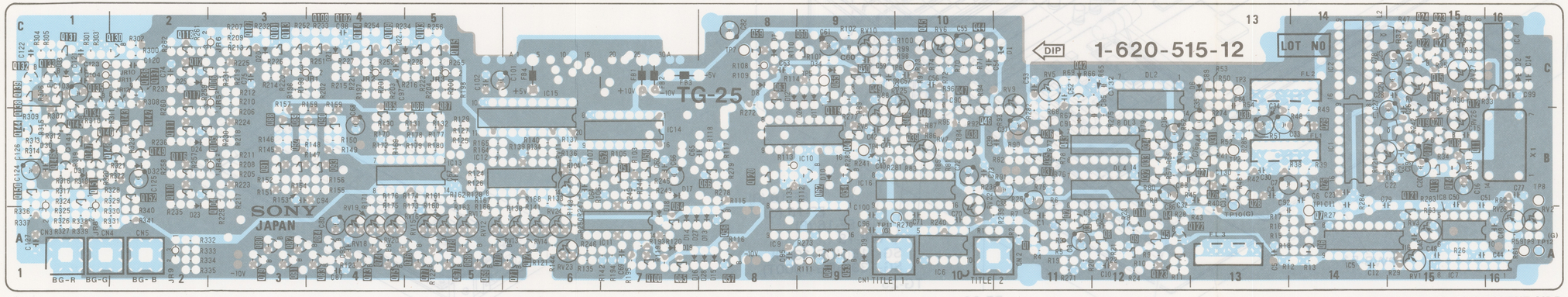


TG-25 BOARD

Component side



1-620-515-12 COMPONENT SIDE



1-620-515-12 COMPONENT SIDE

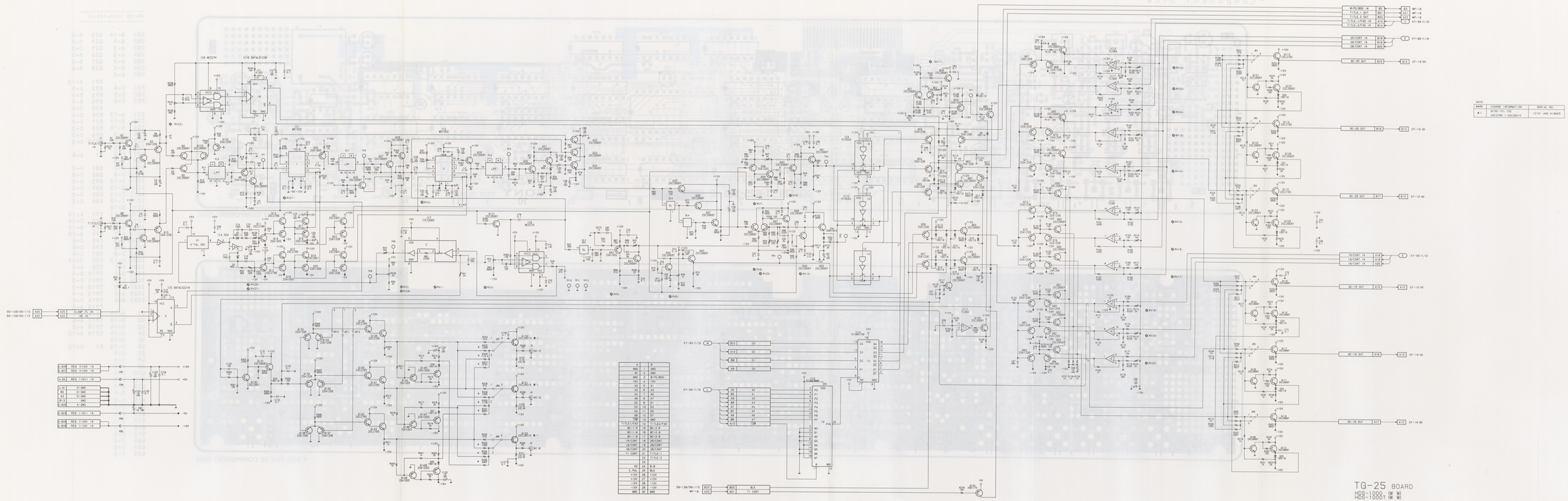
TG-25 1-620-515-12

D1	C-11	Q1	A-11	Q61	A-9	Q135	C-1
D2	C-16	Q2	A-11	Q62	B-9	Q136	C-2
D3	C-15	Q3	A-11	Q63	C-8	Q137	C-2
D6	C-13	Q4	A-12	Q64	A-7	Q138	C-1
D7	C-8	Q5	A-12	Q65	A-7	Q139	C-1
D8	C-8	Q6	A-14	Q66	B-8	Q140	B-1
D9	A-9	Q7	A-14	Q67	A-7	Q141	B-1
D10	B-9	Q8	A-12	Q68	A-7	Q142	B-2
D11	C-9	Q9	A-12	Q69	A-7	Q143	B-2
D12	C-8	Q10	A-12	Q70	A-7	Q144	B-1
D13	A-8	Q11	B-15	Q71	A-6	Q145	B-1
D14	A-7	Q12	C-15	Q72	A-6	Q146	B-1
D15	A-8	Q13	B-15	Q73	A-4	Q147	B-1
D16	A-7	Q14	B-15	Q74	A-4	Q148	B-2
D17	B-7	Q15	C-15	Q75	A-4	Q149	B-2
D18	A-7	Q16	C-15	Q76	A-5	Q150	B-1
D19	A-7	Q17	B-15	Q77	A-5	Q151	B-1
D20	C-3	Q18	B-15	Q78	A-5	Q152	B-2
D21	C-4	Q19	B-15	Q79	A-3		
D22	C-5	Q20	B-15	Q80	A-3	RV1	A-15
D23	A-2	Q21	C-15	Q81	A-3	RV2	A-16
D24	B-2	Q22	C-15	Q82	A-3	RV3	A-15
D25	A-2	Q23	C-15	Q83	A-4	RV4	C-15
D26	C-9	Q24	C-15	Q84	A-4	RV5	C-11
D27	A-7	Q25	B-14	Q85	B-4	RV6	C-10
D28	A-8	Q26	B-13	Q86	B-5	RV7	B-10
D30	B-1	Q27	B-13	Q87	B-5	RV8	B-9
D31	B-1	Q28	B-13	Q88	B-3	RV9	C-11
D32	B-2	Q29	B-14	Q89	B-4	RV10	C-9
D33	C-1	Q30	B-13	Q90	B-4	RV11	B-6
D34	C-9	Q31	B-13	Q91	B-3	RV12	A-5
		Q32	B-12	Q92	B-3	RV13	A-6
DL2	C-12	Q33	B-12	Q93	B-4	RV14	A-6
DL3	B-12	Q34	B-12	Q100	A-7	RV15	A-5
DL4	B-12	Q35	B-11	Q101	C-3	RV16	A-5
		Q36	B-11	Q102	C-4	RV17	A-5
FB1	C-7	Q37	B-11	Q103	C-5	RV18	A-4
FB2	C-7	Q38	B-10	Q104	B-2	RV19	A-4
FB3	C-7	Q39	B-10	Q105	B-2	RV20	A-4
FB4	C-6	Q40	B-10	Q106	C-2	RV21	B-15
		Q41	B-9	Q107	C-3	RV22	A-10
FL1	B-13	Q42	C-11	Q108	C-4	RV23	A-6
FL2	C-13	Q43	B-11	Q109	C-4	RV24	A-6
FL3	A-13	Q44	C-10	Q110	B-2	RV25	C-10
		Q45	C-10	Q111	B-2	RV26	B-15
IC1	B-14	Q46	C-10	Q112	C-2	RV27	C-15
IC2	C-14	Q47	C-10	Q113	C-3	RV28	A-16
IC4	C-16	Q48	C-10	Q114	C-4		
IC5	A-14	Q49	C-9	Q115	C-5	TP1	A-14
IC6	A-10	Q50	C-9	Q116	B-2	TP2	B-13
IC7	A-15	Q51	B-7	Q117	B-2	TP3	C-13
IC8	A-15	Q52	B-6	Q118	C-2	TP4	B-9
IC9	A-9	Q53	A-9	Q119	C-9	TP5	C-9
IC10	B-9	Q54	B-9	Q120	B-2	TP6	C-10
IC11	A-7	Q55	C-9	Q121	A-15	TP7	C-8
IC12	B-6	Q56	A-8	Q122	A-12	TP8	B-16
IC13	B-5	Q57	A-8	Q123	A-12	TP9	A-16
IC14	B-7	Q58	B-7	Q130	C-2	TP10	B-13
IC15	B-6	Q59	C-8	Q131	C-1	TP11	A-10
IC16	B-10	Q60	C-9	Q132	C-1	TP12	A-16
				Q133	C-1		
				Q134	B-1	X1	B-16

HDS-1000 (W W)
HDS-1000T (W W)

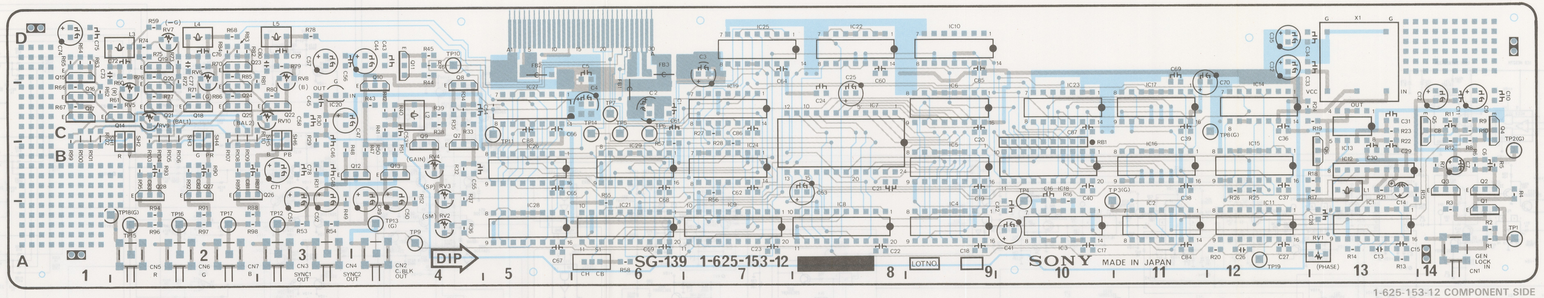
HDS-1000
HDS-1000T
TG-25
TG-25
HDS-1000
HDS-1000T

TG-25 BOARD
TITLE GEN

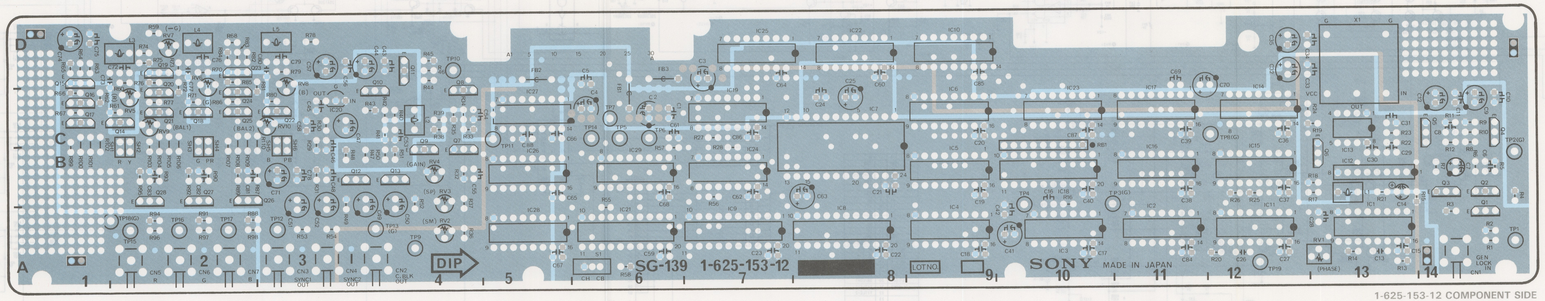


HDS-1000 (W W)
HDS-1000T (W W)

SG-139 BOARD
– Component Side –



1-625-153-12 COMPONENT SIDE

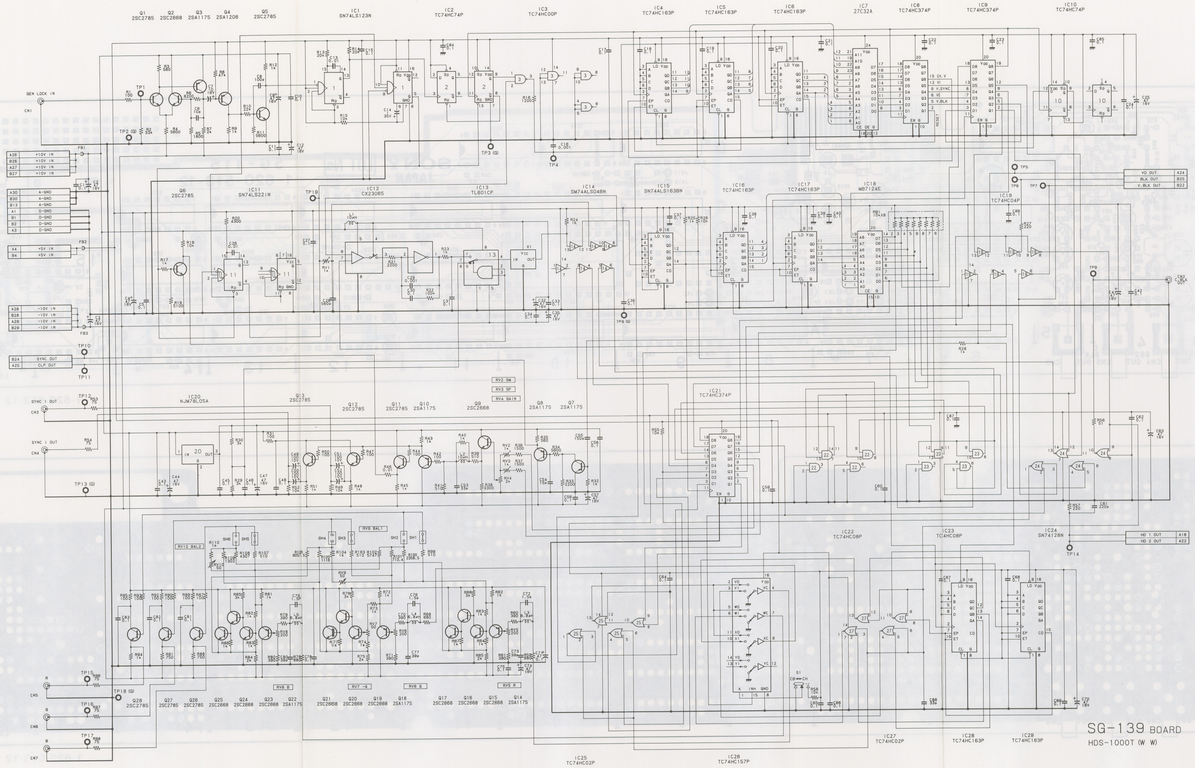


1-625-153-12 COMPONENT SIDE

SG-139 1-625-153-12

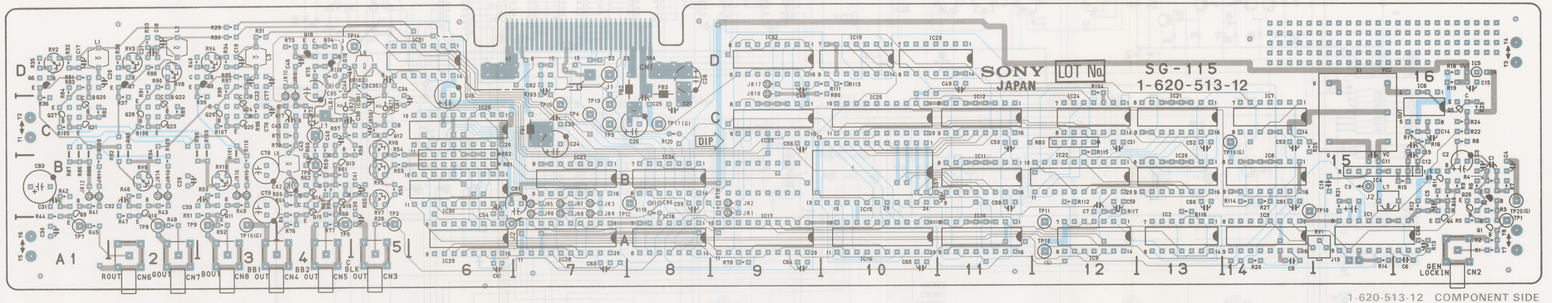
CN1	A-14	Q23	D-2
CN2	A-4	Q24	C-2
CN3	A-3	Q25	C-2
CN4	A-3	Q26	B-2
CN5	A-2	Q27	B-2
CN6	A-2	Q28	B-2
CN7	A-2		
		RV1	A-13
FB1	C-6	RV2	A-4
FB2	D-5	RV3	B-4
FB3	D-6	RV4	B-4
		RV5	C-2
IC1	A-13	RV6	D-2
IC2	A-11	RV7	D-2
IC3	A-10	RV8	D-3
IC4	A-9	RV9	C-2
IC5	B-9	RV10	C-3
IC6	C-9		
IC7	C-8	S1	A-6
IC8	A-8		
IC9	A-7	SH1	C-1
IC10	D-9	SH2	C-2
IC11	A-12	SH3	C-2
IC12	B-13	SH4	C-2
IC13	C-13	SH5	C-3
IC14	C-12	SH6	C-3
IC15	B-12		
IC16	B-11	TP1	A-14
IC17	C-11	TP2	C-14
IC18	B-10	TP3	B-11
IC19	C-7	TP4	B-10
IC20	C-3	TP5	C-6
IC21	A-6	TP6	C-6
IC22	D-8	TP7	C-6
IC23	C-10	TP8	C-12
IC24	B-7	TP9	A-4
IC25	D-7	TP10	D-4
IC26	C-5	TP11	C-5
IC27	C-5	TP12	A-3
IC28	A-5	TP13	A-4
IC29	B-6	TP14	C-6
		TP15	A-2
Q1	B-14	TP16	A-2
Q2	B-14	TP17	A-2
Q3	B-14	TP18	A-2
Q4	C-14	TP19	A-12
Q5	C-14		
Q6	C-13	X1	D-13
Q7	C-4		
Q8	C-4		
Q9	C-4		
Q10	C-4		
Q11	D-4		
Q12	B-4		
Q13	B-4		
Q14	C-2		
Q15	D-1		
Q16	C-1		
Q17	C-1		
Q18	C-2		
Q19	D-2		
Q20	C-2		
Q21	C-2		
Q22	C-3		

SG-139 BOARD

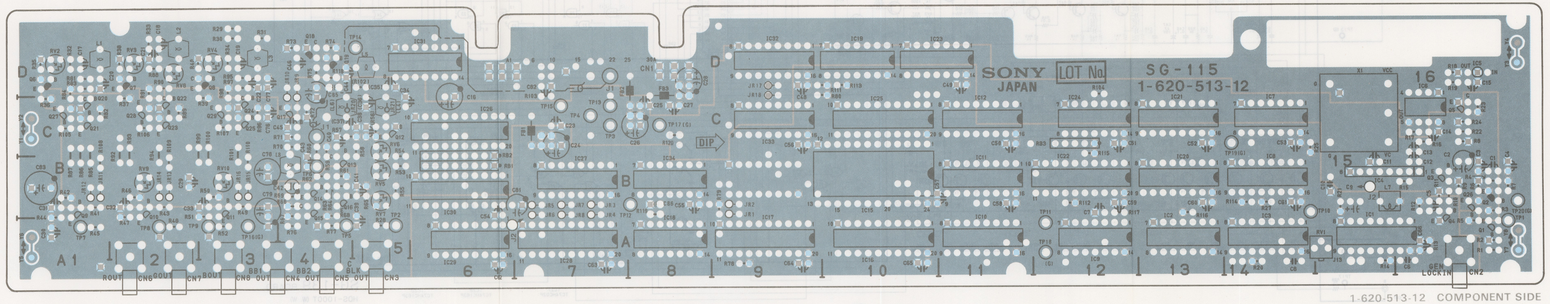


SG-139 BOARD
HDS-1000T (W W)

SG-115 BOARD
Component side



1-620-513-12 COMPONENT SIDE



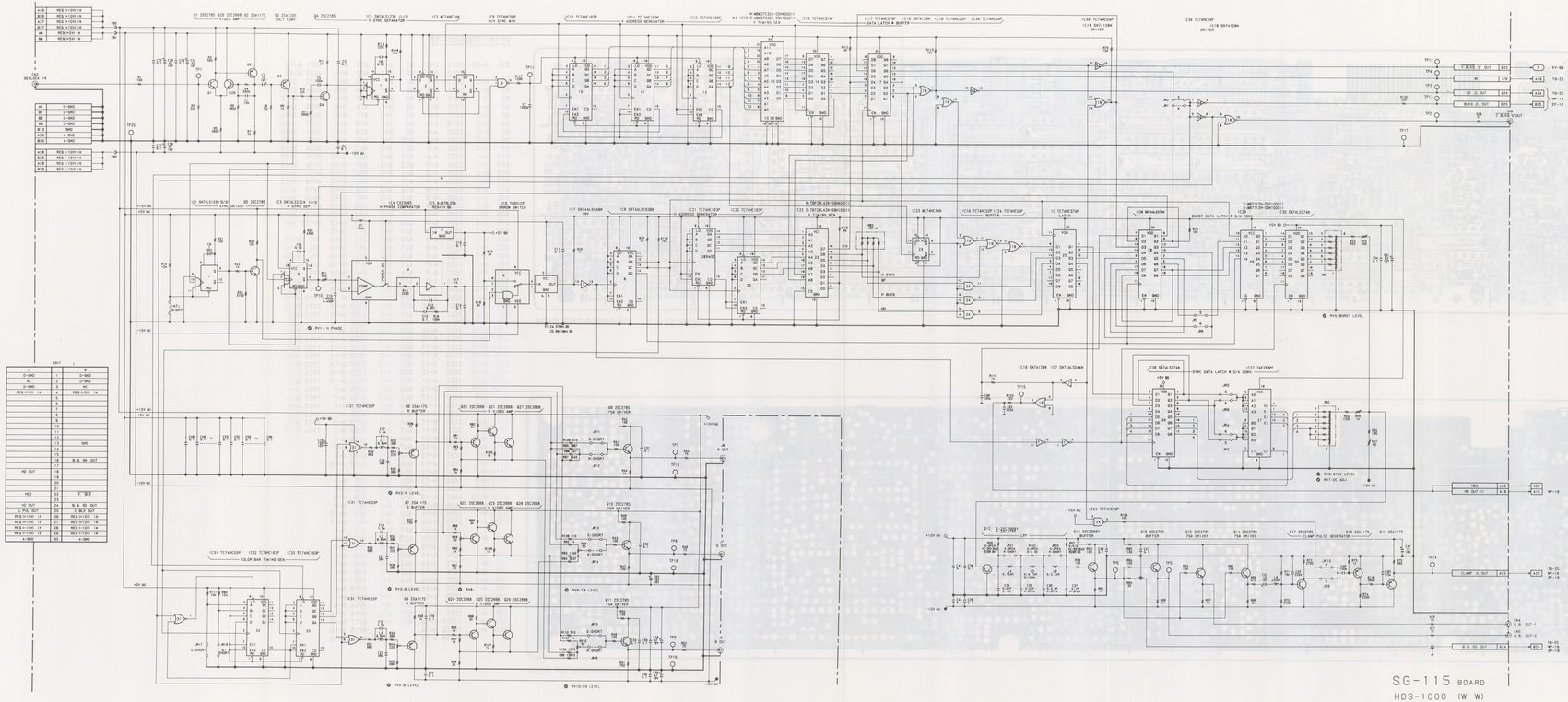
1-620-513-12 COMPONENT SIDE

SG-115 1-620-513-12

FB1	C-7	Q16	B-4		
FB2	C-7	Q17	C-4		
FB3	C-8	Q18	D-4		
		Q19	D-4		
IC1	A-15	Q20	C-1		
IC2	A-13	Q21	C-1		
IC3	A-14	Q22	C-2		
IC4	B-15	Q23	C-2		
IC5	D-16	Q24	C-3		
IC6	C-16	Q25	C-3		
IC7	C-14	Q26	A-16		
IC8	B-14	Q27	C-1		
IC9	A-12	Q28	C-2		
IC10	A-11	Q29	C-3		
IC11	B-11				
IC15	B-10	RB1	B-6		
IC16	A-10	RB2	B-6		
IC17	A-9	RB3	C-12		
IC18	A-8				
IC19	D-10	RV1	A-15		
IC20	B-13	RV2	D-1		
IC21	C-13	RV3	D-2		
IC22	B-12	RV4	D-2		
IC23	D-11	RV5	B-5		
IC24	C-12	RV6	C-5		
IC25	C-10	RV7	B-5		
IC26	C-6	RV8	D-2		
IC27	B-7	RV9	B-2		
IC28	A-7	RV10	B-3		
IC29	A-6				
IC30	B-6	X1	C-15		
IC31	D-6				
IC32	D-9	TP1	A-16		
IC33	C-9	TP2	A-5		
IC34	B-8	TP3	C-7		
		TP4	C-7		
Q1	A-16	TP5	A-4		
Q2	B-16	TP6	B-4		
Q3	B-2	TP7	A-1		
Q4	A-16	TP8	A-2		
Q5	C-16	TP9	A-3		
Q6	D-1	TP10	A-14		
Q7	D-2	TP11	A-12		
Q8	D-3	TP12	B-8		
Q9	B-1	TP13	C-7		
Q10	B-2	TP14	D-5		
Q11	B-3	TP15	C-7		
Q12	C-5				
Q13	B-4	TPE1	A-3		
Q14	B-4	TPE2	C-8		
Q15	B-4	TPE3	A-12		
Q16	B-4	TPE4	C-14		
Q15	B-4	TPE5	B-16		
		X1	C-15		

SG-115 BOARD

SYNC GEN



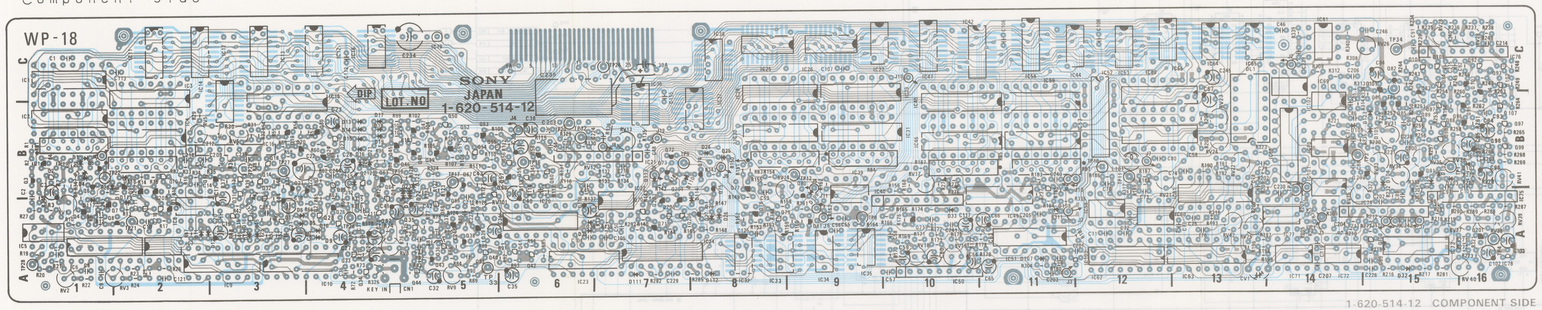
HDS-1000 | SG-115 | SG-115 | HDS-1000

SG-115 BOARD

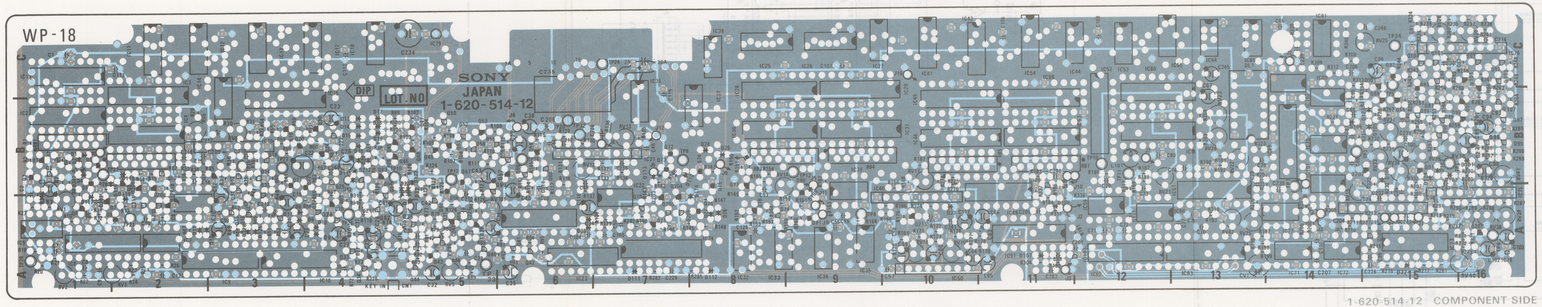
HDS-1000 (W W)

WP-18 BOARD

Component side



1-620-514-12 COMPONENT SIDE



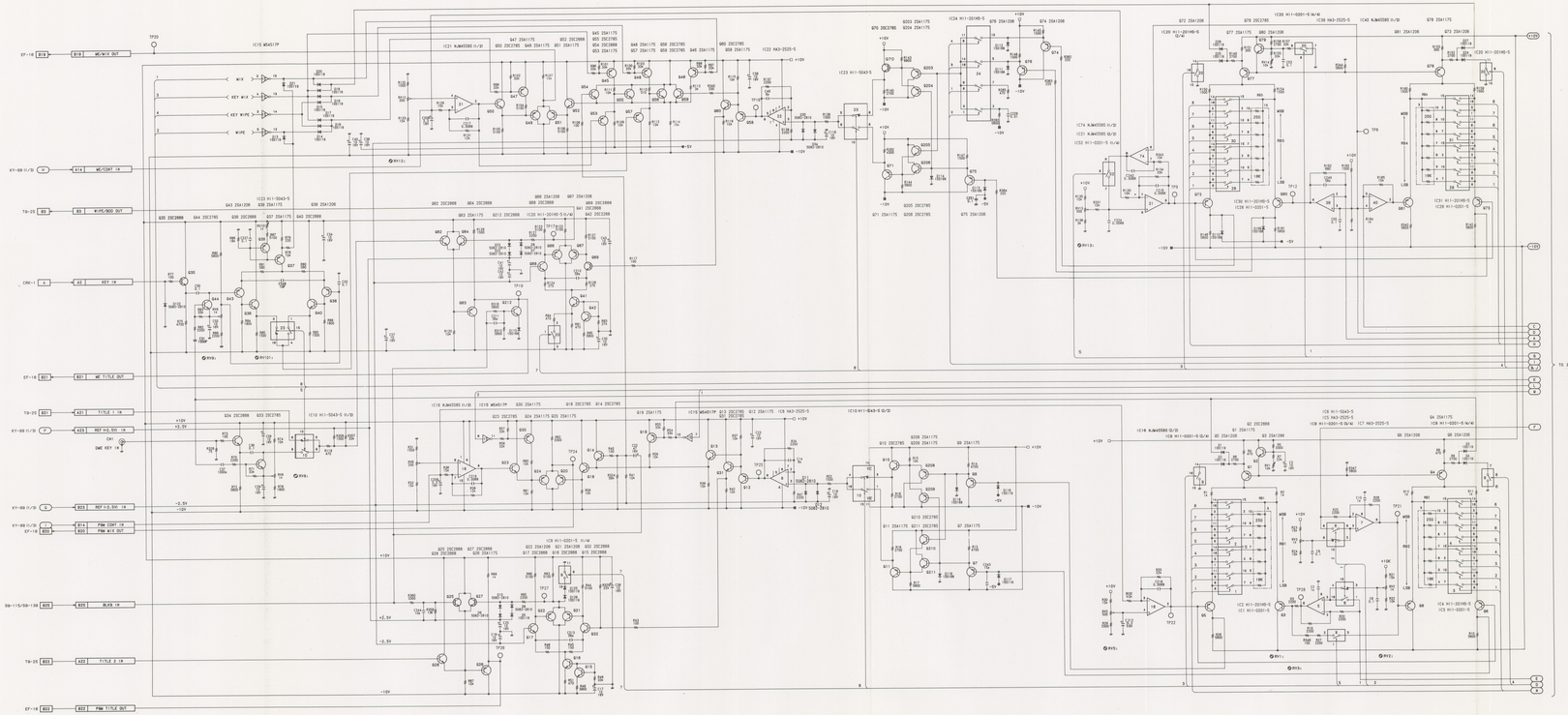
1-620-514-12 COMPONENT SIDE

WP-18 1-620-514-12

CV1	A-13	IC11	C-2	Q1	B-1	Q71	A-7	RV21	B-12		
		IC12	C-2	Q2	B-1	Q72	B-7	RV22	B-13		
D1	A-1	IC13	C-3	Q2	B-1	Q73	B-7	RV23	C-13		
D2	A-1	IC14	B-3	Q4	A-1	Q74	B-8	RV24	C-13		
D3	A-1	IC15	B-3	Q5	B-1	Q75	B-8	RV25	A-13		
D4	A-1	IC16	B-3	Q6	B-1	Q76	A-8	RV26	C-14		
D5	A-3	IC17	C-4	Q7	A-1	Q77	B-8	RV28	C-14		
D6	A-3	IC18	C-4	Q8	A-2	Q78	A-8	RV29	C-16		
D7	B-5	IC20	A-6	Q9	B-2	Q79	A-8	RV31	B-15		
D8	B-5	IC21	B-7	Q10	B-2	Q80	A-9	RV33	B-15		
D9	A-4	IC22	A-7	Q11	A-2	Q81	A-9	RV34	B-15		
D10	A-4	IC23	A-6	Q12	B-3	Q82	C-15	RV35	B-15		
D11	A-4	IC24	A-7	Q13	B-3	Q83	B-15	RV36	B-15		
D13	B-4	IC25	C-8	Q14	B-3	Q84	C-15	RV37	A-16		
D14	B-4	IC26	C-9	Q15	A-3	Q85	B-15	RV38	A-16		
D15	B-4	IC27	C-9	Q16	A-3	Q86	B-15	RV39	A-16		
D16	B-4	IC28	B-8	Q17	A-3	Q87	B-15	RV40	A-16		
D17	B-4	IC29	B-9	Q18	B-3	Q88	B-15	RV41	B-16		
D18	B-4	IC30	B-9	Q19	B-3	Q89	B-15	RV42	A-13		
D19	B-4	IC31	B-9	Q20	B-3	Q90	B-15	RV101	A-5		
D20	B-4	IC32	A-8	Q21	B-3	Q91	B-15				
D21	B-4	IC33	A-8	Q22	B-4	Q92	C-16	TP1	B-15		
D22	B-5	IC34	A-8	Q23	B-4	Q93	C-16	TP3	B-14		
D23	B-5	IC35	A-9	Q24	B-4	Q94	B-16	TP4	A-16		
D24	B-8	IC36	B-7	Q25	B-4	Q95	B-16	TP5	C-15		
D25	B-8	IC37	B-7	Q26	A-4	Q96	B-16	TP7	A-14		
D26	A-8	IC38	C-8	Q27	A-4	Q97	B-16	TP8	A-9		
D27	A-8	IC39	A-9	Q28	A-4	Q98	B-16	TP9	B-7		
D32	A-15	IC40	A-10	Q29	A-4	Q99	B-16	TP10	B-12		
D33	A-10	IC41	C-10	Q30	B-4	Q100	A-15	TP11	B-12		
D34	A-6	IC42	C-10	Q31	B-3	Q101	B-15	TP12	B-9		
D35	A-6	IC44	C-12	Q32	A-3	Q102	C-16	TP16	B-6		
D101	B-16	IC45	B-10	Q33	A-4	Q103	A-12	TP17	B-5		
D102	B-15	IC46	B-10	Q34	A-4	Q104	C-15	TP19	B-4		
D103	B-15	IC47	B-11	Q35	A-5	Q105	C-15	TP20	B-6		
D104	B-15	IC48	B-11	Q36	A-5	Q106	B-11	TP21	A-2		
D105	B-15	IC49	A-11	Q37	A-5	Q107	B-16	TP22	B-1		
D106	B-14	IC50	A-10	Q38	A-5	Q201	A-16	TP24	C-7		
D107	A-11	IC51	A-11	Q39	A-5	Q202	B-15	TP25	B-3		
D108	A-11	IC52	B-12	Q40	A-5	Q203	A-7	TP26	A-4		
D109	B-9	IC53	C-12	Q41	A-6	Q204	A-7	TP27	B-3		
D110	B-7	IC54	C-11	Q42	A-6	Q205	A-7	TP28	A-1		
D111	A-7	IC55	C-12	Q43	A-5	Q206	A-7	TP32	B-6		
D112	A-8	IC56	B-11	Q44	A-5	Q208	B-2	TP33	A-5		
D113	B-7	IC57	B-11	Q45	B-4	Q209	B-2	TP34	C-15		
D114	A-8	IC58	B-11	Q46	B-4	Q210	A-2				
D115	B-4	IC59	A-12	Q47	B-5	Q211	A-2				
D116	B-2	IC60	A-12	Q48	B-5	Q212	B-4				
D117	A-1	IC61	A-13	Q49	B-5	Q213	A-10				
D118	B-2	IC62	A-12	Q50	B-5						
D119	A-2	IC63	A-13	Q51	B-5	RB1	B-1				
D122	B-5	IC64	C-13	Q52	B-5	RB2	B-2				
D123	B-15	IC65	C-13	Q53	B-5	RB3	B-8				
D124	B-15	IC68	B-14	Q54	B-5	RB4	B-9				
D125	A-3	IC69	B-14	Q55	B-5	RB5	B-10				
D126	A-3	IC70	B-14	Q56	B-6	RB7	B-11				
		IC71	A-14	Q57	B-6	RV1	A-1				
DL1	B-13	IC72	A-14	Q58	B-6	RV2	A-1				
	a	IC73	A-15	Q59	B-6	RV3	A-2				
IC1	C-1	IC74	A-15	Q60	B-6	RV5	B-2				
IC2	B-1	IC75	A-16	Q62	A-4	RV6	B-3				
IC3	C-2	IC76	C-16	Q63	B-4	RV8	A-4				
IC4	B-2	IC77	A-16	Q64	A-4	RV9	A-5				
IC5	A-1	IC78	A-16	Q66	B-5	RV12	B-6				
IC6	A-1	IC79	C-5	Q67	B-5	RV13	B-7				
IC7	A-1	IC80	B-12	Q68	A-5	RV14	B-8				
IC8	A-2	IC81	C-14	Q69	B-5	RV16	A-14				
IC9	A-3	IC101	A-14	Q70	A-7	RV17	B-10				
IC10	A-3	IC102	B-14			RV18	A-10				
		IC103	A-12			RV19	A-10				

HDS-1000 (W W)
HDS-1000T (W W)

WP-18 (1/2) BOARD
WIPE PATTERN GEN

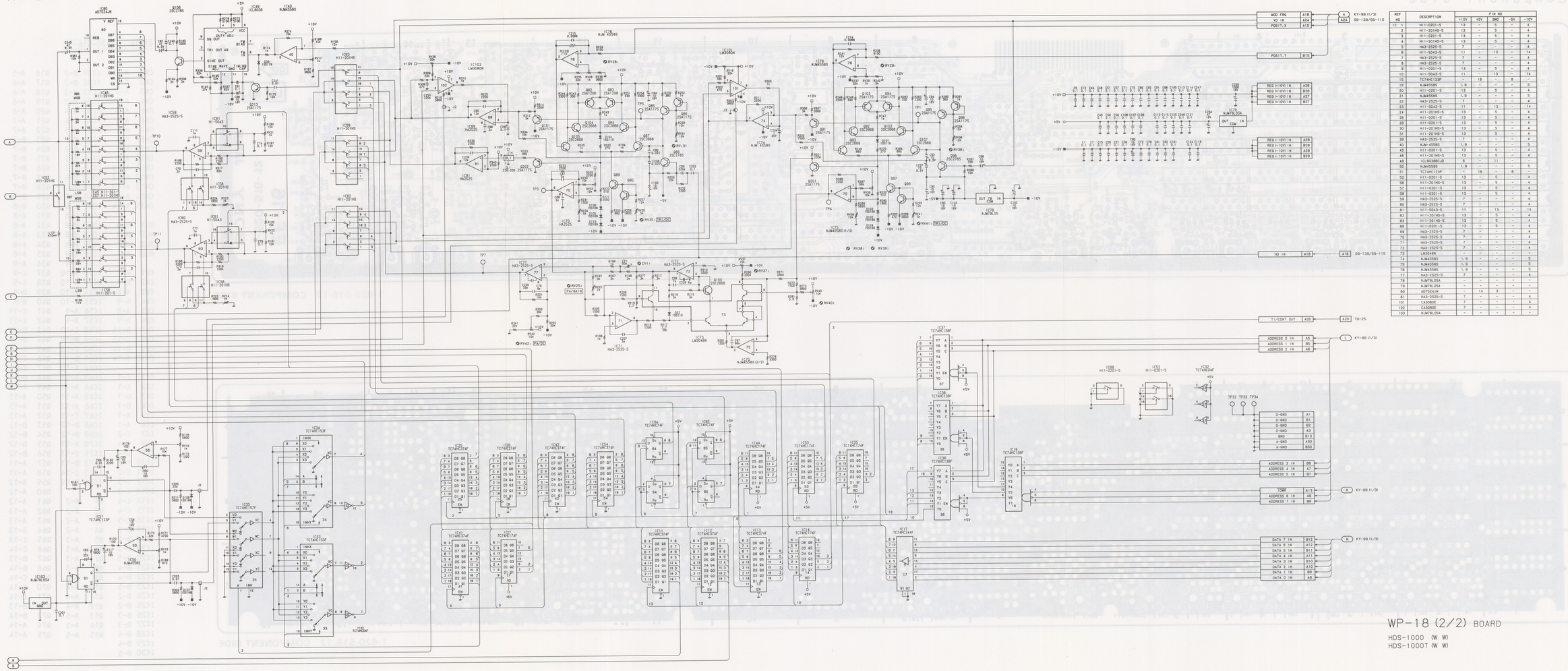


HDS-1000
HDS-1000T
WP-18 (1/2)
WP-18 (1/2)
HDS-1000
HDS-1000T

WP-18 (1/2) BOARD
HDS-1000 (W W)
HDS-1000T (W W)

WP-18 (2/2)
HDS-1000
HDS-1000T
HDS-1000
HDS-1000T
WP-18 (2/2)

WP-18 (2/2) BOARD
WIPE PATTERN GEN

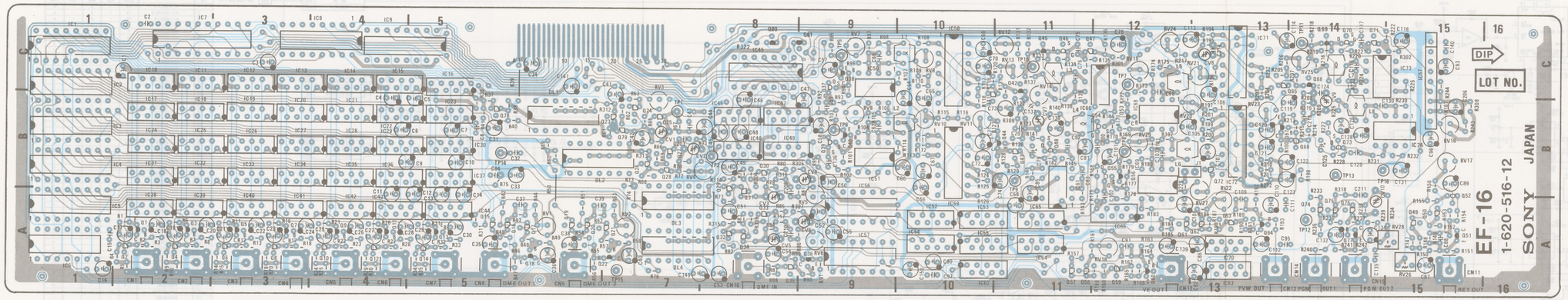


REF NO	DESCRIPTION	PIN NO +10V	+5V	GND	-5V	-10V
IC 1	H11-0201-S	13	-	5	-	4
2	H11-201HS-S	13	-	5	-	4
3	H11-0201-S	13	-	5	-	4
4	H11-201HS-S	13	-	5	-	4
5	HA3-2525-S	7	-	-	-	4
6	H11-5043-S	11	-	13	-	14
7	HA3-2525-S	7	-	-	-	4
8	HA3-2525-S	7	-	-	-	4
9	H11-0201-S	13	-	5	-	4
10	H11-5043-S	11	-	13	-	14
15	TC74HC123P	-	16	-	8	-
16	NJM4558S	1, 9	-	-	-	5
20	H11-0201-S	13	-	5	-	4
21	NJM4558S	1, 9	-	-	-	5
22	HA3-2525-S	7	-	-	-	4
23	H11-5043-S	11	-	13	-	14
24	H11-201HS-S	13	-	5	-	4
28	H11-0201-S	13	-	5	-	4
29	H11-0201-S	13	-	5	-	4
30	H11-201HS-S	13	-	5	-	4
31	H11-201HS-S	13	-	5	-	4
39	HA3-2525-S	7	-	-	-	4
40	NJM-4558S	1, 9	-	-	-	5
45	H11-0201-S	13	-	5	-	4
48	H11-201HS-S	13	-	5	-	4
49	ICL8038C/D	6	-	11	-	-
50	NJM4558S	1, 9	-	-	-	5
51	TC74HC123P	-	16	-	8	-
52	H11-0201-S	13	-	5	-	4
56	H11-201HS-S	13	-	5	-	4
57	H11-0201-S	13	-	5	-	4
58	H11-0201-S	13	-	5	-	4
59	HA3-2525-S	7	-	-	-	4
60	HA3-2525-S	7	-	-	-	4
61	H11-5043-S	11	-	13	-	14
62	H11-201HS-S	13	-	5	-	4
63	H11-201HS-S	13	-	5	-	4
68	H11-0201-S	13	-	5	-	4
69	HA3-2525-S	7	-	-	-	4
70	HA3-2525-S	7	-	-	-	4
71	HA3-2525-S	7	-	-	-	4
72	HA3-2525-S	7	-	-	-	4
73	LM3046N	-	-	-	-	-
74	NJM4558S	1, 9	-	-	-	5
75	NJM4558S	1, 9	-	-	-	5
76	NJM4558S	1, 9	-	-	-	5
77	HA3-2525-S	7	-	-	-	4
78	NJM78L05A	-	-	-	-	-
79	NJM78L05A	-	-	-	-	-
80	AD7524JN	-	14	3	-	-
81	HA3-2525-S	7	-	-	-	4
101	CA3080E	7	-	-	-	4
102	CA3080E	7	-	-	-	4
103	NJM78L05A	-	-	-	-	-

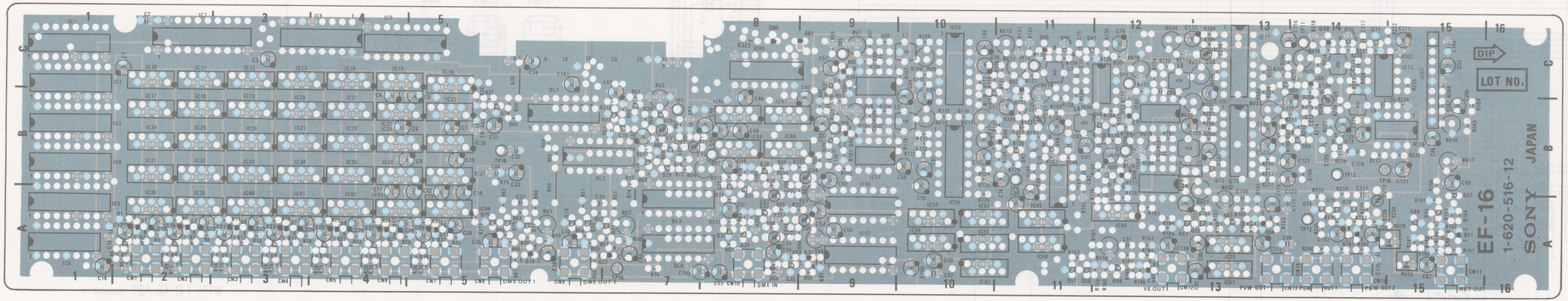
WP-18 (2/2) BOARD
HDS-1000 (W W)
HDS-1000T (W W)

EF-16 BOARD

Component side



1-620-516-12 COMPONENT SIDE



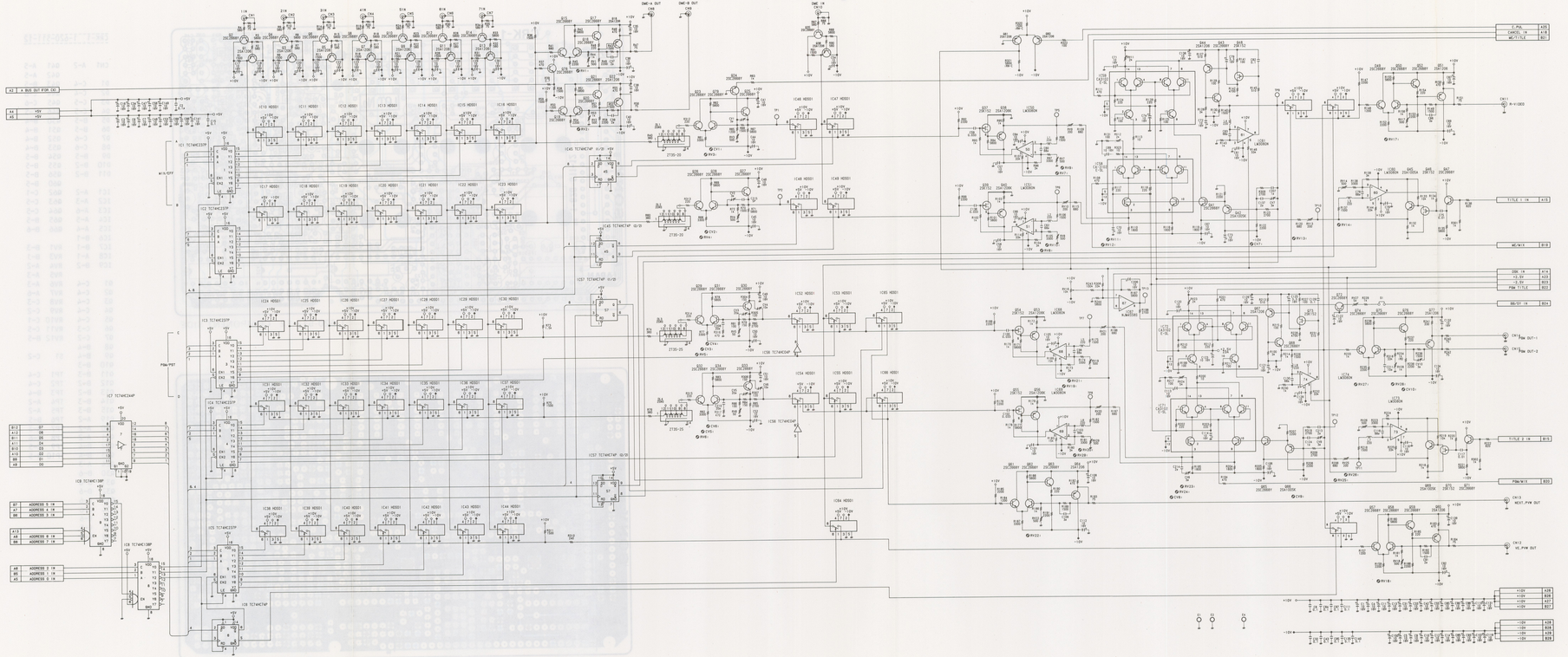
1-620-516-12 COMPONENT SIDE

EF-16 1-620-516-12

CN1	A-2	IC31	B-2	Q16	A-5	Q76	A-14				
CN2	A-2	IC32	B-2	Q17	A-6	Q77	A-14				
CN3	A-3	IC33	B-3	Q18	A-6	Q78	B-5				
CN4	A-3	IC34	B-3	Q19	A-6	Q79	B-7				
CN5	A-4	IC35	B-4	Q20	A-6	Q80	C-8				
CN6	A-4	IC36	B-4	Q21	A-7	Q81	C-9				
CN7	A-5	IC37	B-5	Q22	A-7						
CN8	A-5	IC38	B-2	Q23	B-7	RV1	A-6				
CN9	A-6	IC39	B-2	Q24	B-7	RV2	A-7				
CN10	A-8	IC40	B-3	Q25	B-7	RV3	B-7				
CN11	A-15	IC41	B-3	Q26	B-7	RV4	B-8				
CN12	A-12	IC42	B-4	Q27	B-7	RV5	A-9				
CN13	A-13	IC43	B-4	Q28	B-7	RV6	A-9				
CN14	A-14	IC44	B-5	Q29	B-8	RV7	C-9				
CN15	A-14	IC45	C-8	Q30	B-8	RV8	B-9				
		IC46	B-8	Q31	A-8	RV9	C-10				
DL1	B-6	IC47	B-8	Q32	A-8	RV10	B-10				
DL2	B-6	IC48	B-8	Q33	A-8	RV11	B-10				
DL3	A-7	IC49	B-8	Q34	A-8	RV12	C-11				
DL4	A-7	IC50	C-9	Q35	A-8	RV13	C-11				
		IC51	B-9	Q36	A-9	RV14	C-11				
CV1	B-7	IC52	A-10	Q37	C-9	RV16	B-15				
CV2	B-7	IC53	A-10	Q38	C-9	RV17	B-15				
CV3	A-8	IC54	A-10	Q39	B-9	RV18	A-12				
CV4	B-9	IC55	A-10	Q40	B-9	RV19	C-12				
CV5	A-8	IC56	A-9	Q41	C-11	RV20	B-13				
CV6	A-9	IC57	A-9	Q42	C-11	RV21	C-13				
CV7	B-11	IC58	C-10	Q43	B-11	RV22	A-13				
CV8	C-13	IC59	B-10	Q44	B-11	RV23	B-13				
CV9	B-14	IC60	C-12	Q45	C-11	RV24	C-12				
CV10	A-14	IC61	B-11	Q46	C-11	RV25	C-14				
		IC62	A-10	Q47	C-11	RV26	A-15				
IC1	C-1	IC63	A-13	Q48	B-11	RV27	B-13				
IC2	C-1	IC64	A-11	Q49	A-15	RV28	A-15				
IC3	B-1	IC65	A-11	Q50	A-15	RV29	B-12				
IC4	B-1	IC66	A-12	Q51	A-15						
IC5	A-1	IC67	C-15	Q52	A-15	TP1	B-7				
IC6	A-1	IC68	B-12	Q53	B-12	TP2	B-8				
IC7	C-2	IC69	B-12	Q54	B-12	TP5	C-9				
IC8	C-4	IC70	A-13	Q55	B-12	TP6	B-9				
IC9	C-4	IC71	C-13	Q56	B-12	TP7	C-12				
IC10	C-2	IC72	B-13	Q57	A-11	TP8	B-12				
IC11	C-2	IC73	C-14	Q58	A-11	TP9	B-11				
IC12	C-3	IC74	B-15	Q59	A-12	TP10	C-11				
IC13	C-3			Q60	A-12	TP11	C-14				
IC14	C-4	Q1	A-2	Q61	A-12	TP12	A-14				
IC15	C-4	Q2	A-2	Q62	A-13	TP13	B-14				
IC16	C-5	Q3	A-2	Q63	A-13						
IC17	B-2	Q4	A-2	Q64	A-13	TP14	B-5				
IC18	B-2	Q5	A-3	Q65	C-13	TP15	A-7				
IC19	B-3	Q6	A-3	Q66	C-14	TP16	B-15				
IC20	B-3	Q7	A-3	Q67	B-13						
IC21	B-4	Q8	A-3	Q68	B-14						
IC22	B-4	Q9	A-4	Q69	C-14						
IC23	B-5	Q10	A-4	Q70	C-14						
IC24	B-2	Q11	A-4	Q71	C-14						
IC25	B-2	Q12	A-4	Q72	B-13						
IC26	B-3	Q13	A-5	Q73	B-14						
IC27	B-3	Q14	A-5	Q74	A-14						
IC28	B-4	Q15	A-5	Q75	A-14						
IC29	B-4										
IC30	B-5										

EF-16 BOARD

R-VIDEO EFFECT
G-VIDEO EFFECT
B-VIDEO EFFECT



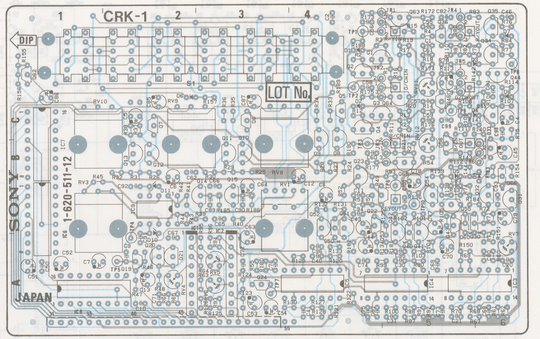
HDS-1000
HDS-1000T
EF-16
EF-16
HDS-1000
HDS-1000T

EF-16 BOARD
HDS-1000 (W/W)
HDS-1000T (W/W)

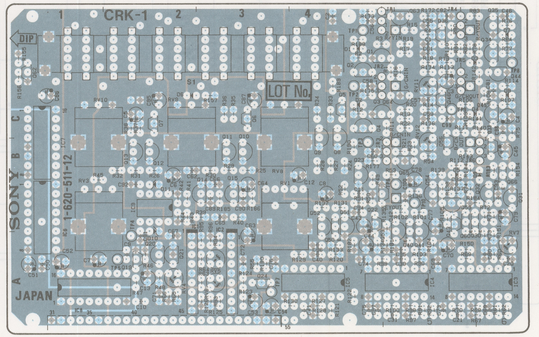
HDS-1000 HDS-1000T	CRK-1	CRK-1	HDS-1000 HDS-1000T

CRK-1 BOARD

Component side



1-620-511-12 COMPONENT SIDE

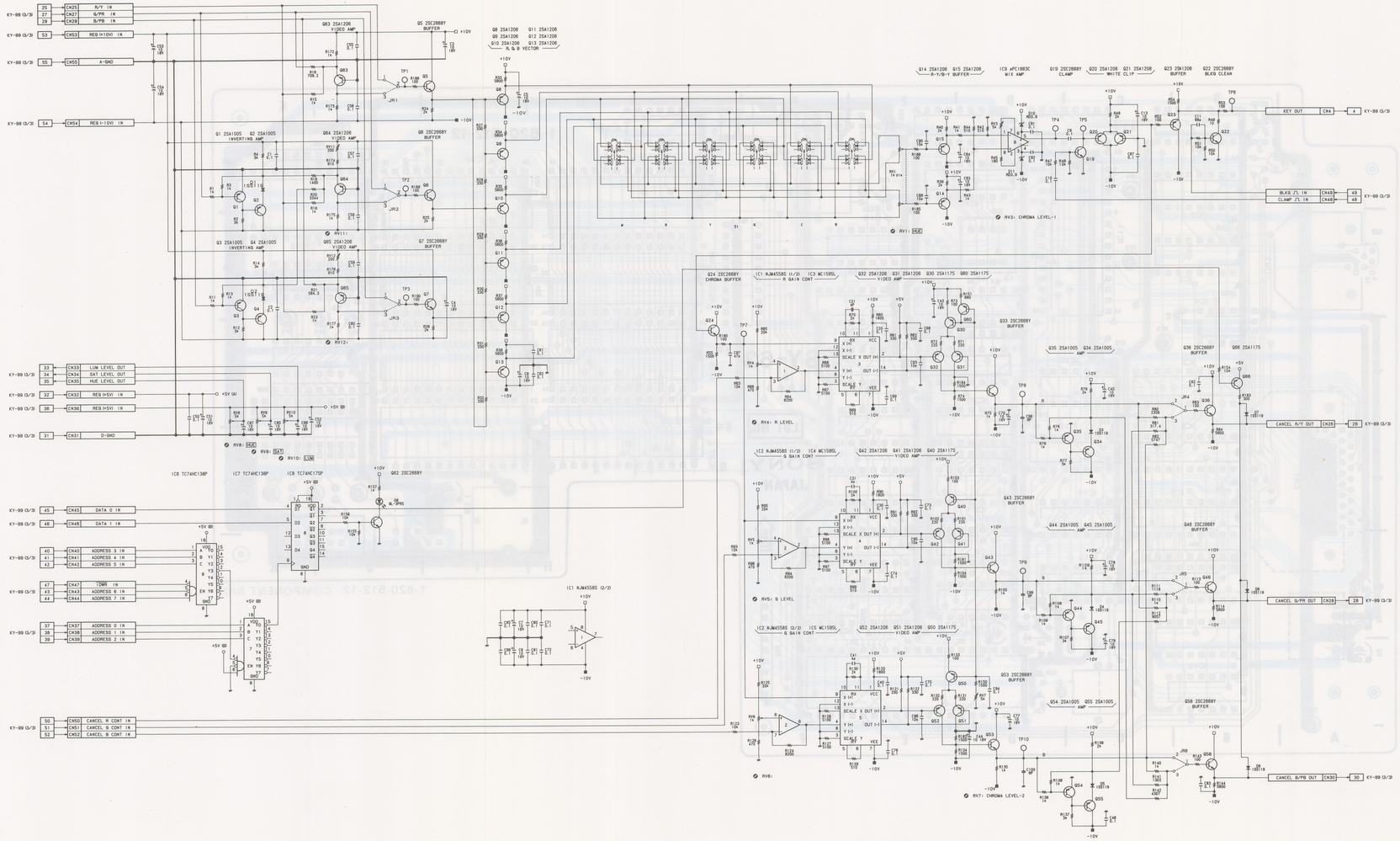


1-620-511-12 COMPONENT SIDE

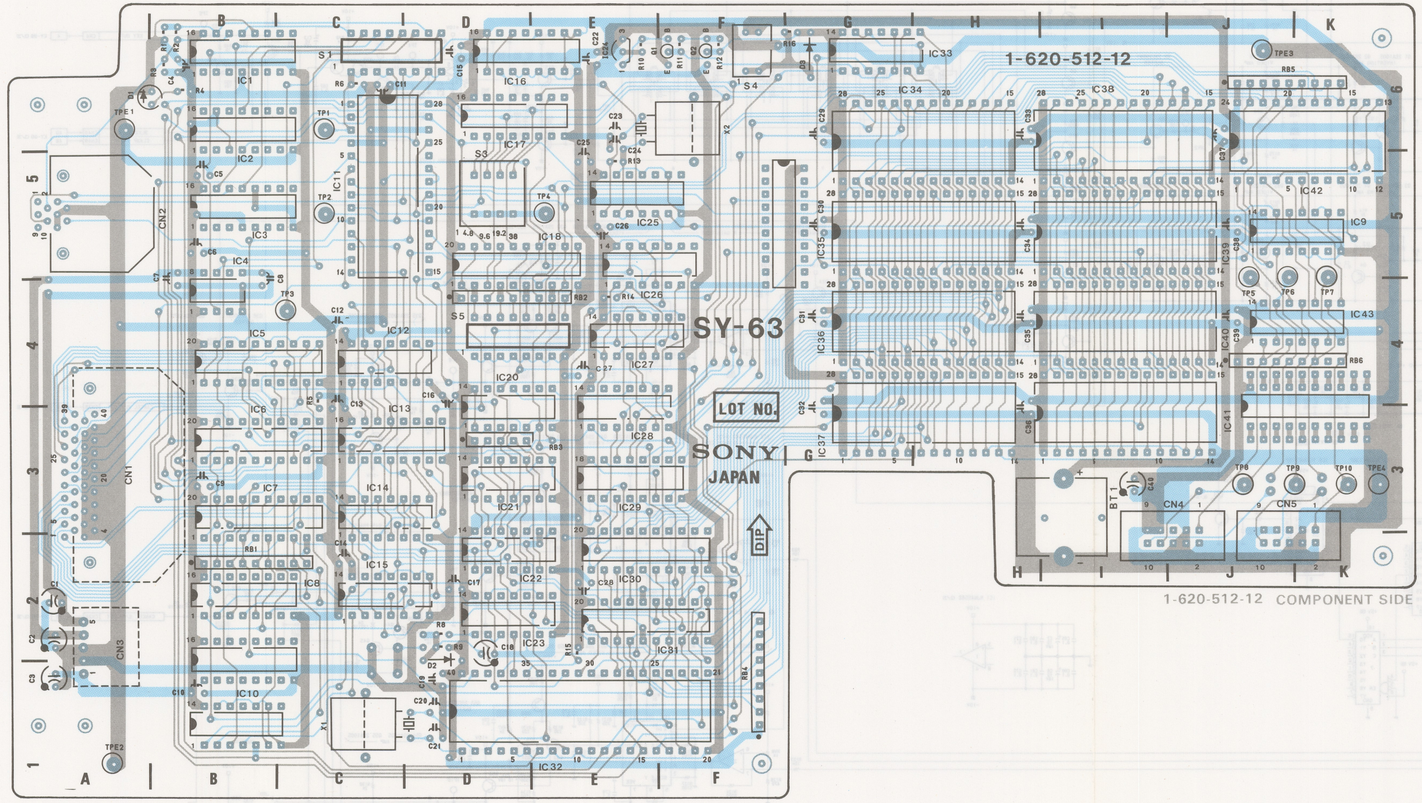
CRK-1 1-620-511-12

CN1	A-2	Q41	A-5
		Q42	A-5
D1	C-4	Q43	B-5
D2	C-4	Q44	C-6
D3	C-5	Q45	C-6
D4	C-5	Q46	C-5
D5	B-5	Q50	B-4
D6	B-5	Q51	B-4
D7	C-6	Q52	B-4
D8	C-6	Q53	B-4
D9	B-5	Q54	B-5
D10	B-2	Q55	B-5
D11	B-2	Q56	B-5
		Q60	B-5
IC1	A-2	Q62	C-1
IC2	A-3	Q63	C-5
IC3	A-6	Q64	C-5
IC4	A-5	Q65	B-5
IC5	A-4	Q66	B-6
IC6	B-1		
IC7	B-1	RV1	B-3
IC8	A-1	RV3	B-1
IC9	B-2	RV4	A-2
		RV5	A-3
Q1	C-4	RV6	A-3
Q2	C-4	RV7	A-6
Q3	C-4	RV8	C-3
Q4	C-4	RV9	C-2
Q5	C-4	RV10	C-1
Q6	C-3	RV11	C-5
Q7	C-2	RV12	B-5
Q8	B-4		
Q9	B-4	S1	C-2
Q10	B-3		
Q11	B-3	TP1	C-4
Q12	B-2	TP2	C-4
Q13	B-2	TP3	B-4
Q14	B-3	TP4	A-2
Q15	B-3	TP5	A-2
Q19	A-2	TP6	B-5
Q20	A-2	TP7	A-3
Q21	A-2	TP8	C-6
Q22	B-4	TP9	C-5
Q23	B-4	TP10	B-5
Q24	A-3		
Q30	B-6		
Q31	B-6		
Q32	B-6		
Q33	C-6		
Q34	C-6		
Q35	C-6		
Q36	C-5		
Q40	A-5		

CRK-1 BOARD
CHROMA KEY SIGNAL GEN


KY-99 (3/3)
CN25 R/Y IN
CN27 B/PR IN
CN28 B/PB IN
CN53 REG (+10V) IN
CN55 A-GND
CN54 REG (-10V) IN
CN33 LUM LEVEL OUT
CN34 SAT LEVEL OUT
CN35 HUE LEVEL OUT
CN32 REG (+5V) IN
CN36 REG (+5V) IN
CN31 D-GND
CN45 DATA 0 IN
CN46 DATA 1 IN
CN40 ADDRESS 3 IN
CN41 ADDRESS 4 IN
CN42 ADDRESS 5 IN
CN47 TOWR IN
CN43 ADDRESS 6 IN
CN44 ADDRESS 7 IN
CN37 ADDRESS 0 IN
CN38 ADDRESS 1 IN
CN39 ADDRESS 2 IN
CN50 CANCEL R CONT IN
CN51 CANCEL G CONT IN
CN52 CANCEL B CONT IN
CN49 BLKG /L IN
CN48 CLAMP /L IN
CN4 KEY OUT
CN26 CANCEL R/Y OUT
CN28 CANCEL G/PR OUT
CN30 CANCEL B/PB OUT
RV1: CHROMA LEVEL-1
RV2: CHROMA LEVEL-2
RV3: R LEVEL
RV4: G LEVEL
RV5: B LEVEL
RV6: LUM
RV7: SAT
RV8: HUE
RV9: R GAIN CONT
RV10: G GAIN CONT
RV11: B GAIN CONT
RV12: B-Y/B-Y BUFFER
IC1 NJM4558S (1/2) R GAIN CONT
IC2 NJM4558S (1/2) G GAIN CONT
IC3 MC1595L
IC4 MC1595L
IC5 MC1595L
IC6 TC74HC175P
IC7 TC74HC138P
IC8 TC74HC175P
IC9 APC1083C W/B AMP
Q1 2SA1005 INVERTING AMP
Q2 2SA1005 INVERTING AMP
Q3 2SA1005 INVERTING AMP
Q4 2SA1005 INVERTING AMP
Q5 2SC2068Y BUFFER
Q6 2SC2068Y BUFFER
Q7 2SC2068Y BUFFER
Q8 2SA1206 Q9 2SA1206 Q10 2SA1206 Q11 2SA1206 Q12 2SA1206 Q13 2SA1206 R-Y/B-Y VECTOR
Q14 2SA1206 Q15 2SA1206 B-Y/B-Y BUFFER
Q19 2SC2068Y CLAMP
Q20 2SA1206 Q21 2SA1206 WHITE CLIP
Q22 2SC2068Y BLKG CLEAN
Q23 2SA1206 BUFFER
Q24 2SC2068Y CHROMA BUFFER
Q25 2SA1005 Q26 2SA1005 AMP
Q27 2SC2068Y BUFFER
Q28 2SA1206 Q29 2SA1206 VIDEO AMP
Q30 2SA1175 Q31 2SA1175 SCALE X OUT
Q32 2SA1206 Q33 2SA1206 VIDEO AMP
Q34 2SA1005 Q35 2SA1005 AMP
Q36 2SC2068Y BUFFER
Q37 2SA1206 Q38 2SA1206 VIDEO AMP
Q39 2SA1175 Q40 2SA1175 SCALE X OUT
Q41 2SA1206 Q42 2SA1206 VIDEO AMP
Q43 2SC2068Y BUFFER
Q44 2SA1005 Q45 2SA1005 AMP
Q46 2SC2068Y BUFFER
Q47 2SA1206 Q48 2SA1206 VIDEO AMP
Q49 2SA1175 Q50 2SA1175 SCALE X OUT
Q51 2SA1206 Q52 2SA1206 VIDEO AMP
Q53 2SC2068Y BUFFER
Q54 2SA1005 Q55 2SA1005 AMP
Q56 2SC2068Y BUFFER
Q58 2SA1206 Q59 2SA1206 VIDEO AMP
Q60 2SA1175 Q61 2SA1175 SCALE X OUT
Q62 2SC2068Y BUFFER
Q63 2SA1206 VIDEO AMP
Q64 2SA1206 VIDEO AMP
Q65 2SA1206 VIDEO AMP
Q66 2SA1206 VIDEO AMP
Q67 2SA1206 VIDEO AMP
Q68 2SA1206 VIDEO AMP
Q69 2SA1206 VIDEO AMP
Q70 2SA1206 VIDEO AMP
Q71 2SA1206 VIDEO AMP
Q72 2SA1206 VIDEO AMP
Q73 2SA1206 VIDEO AMP
Q74 2SA1206 VIDEO AMP
Q75 2SA1206 VIDEO AMP
Q76 2SA1206 VIDEO AMP
Q77 2SA1206 VIDEO AMP
Q78 2SA1206 VIDEO AMP
Q79 2SA1206 VIDEO AMP
Q80 2SA1206 VIDEO AMP
Q81 2SA1206 VIDEO AMP
Q82 2SC2068Y BUFFER
Q83 2SA1206 VIDEO AMP
Q84 2SA1206 VIDEO AMP
Q85 2SA1206 VIDEO AMP
Q86 2SA1206 VIDEO AMP
Q87 2SA1206 VIDEO AMP
Q88 2SA1206 VIDEO AMP
Q89 2SA1206 VIDEO AMP
Q90 2SA1206 VIDEO AMP
Q91 2SA1206 VIDEO AMP
Q92 2SA1206 VIDEO AMP

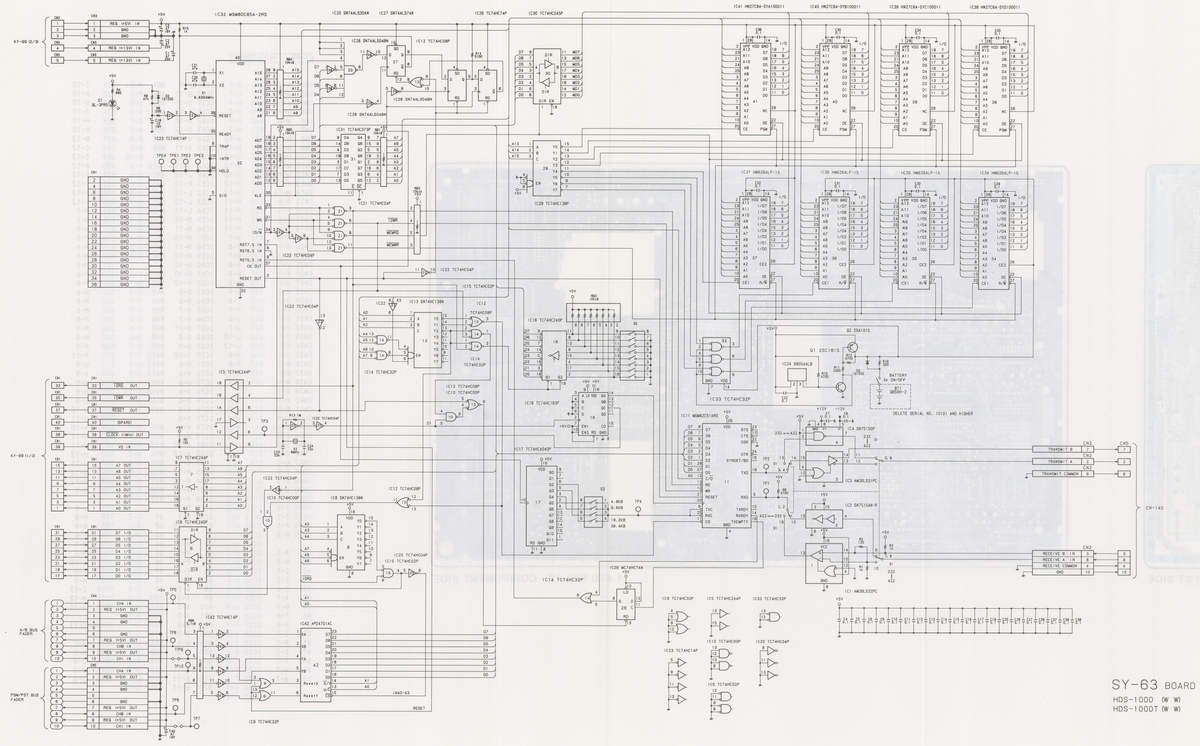
SY-63 BOARD
Component side



1-620-512-12 COMPONENT SIDE

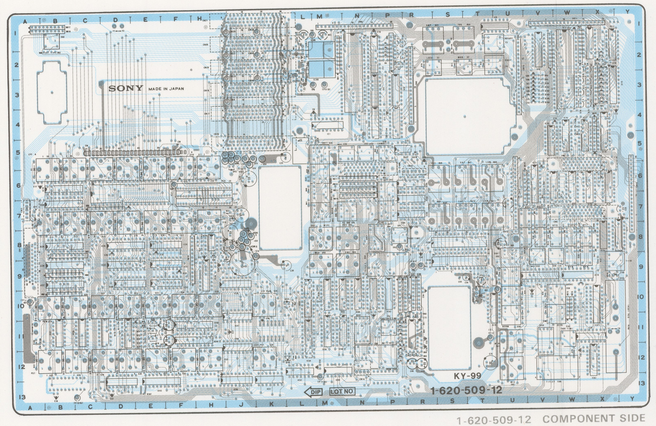
HDS-1000 HDS-1000T SY-63 SY-63 HDS-1000 HDS-1000T

SY-63 BOARD
SYSTEM CONTROLER

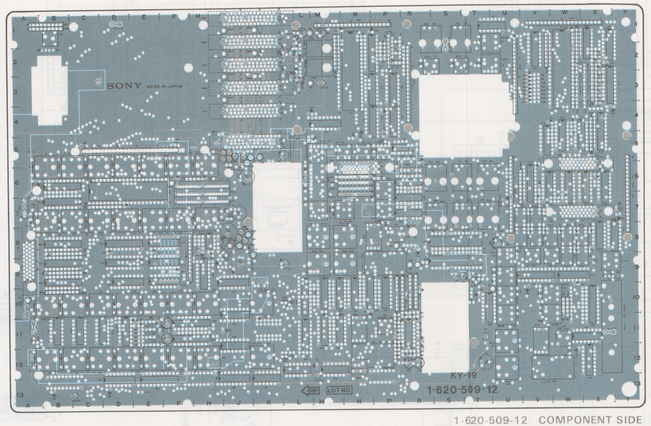


SY-63 BOARD
HDS-1000 (W/W)
HDS-1000T (W/W)

KY-99 BOARD
Component side



1-620-509-12 COMPONENT SIDE

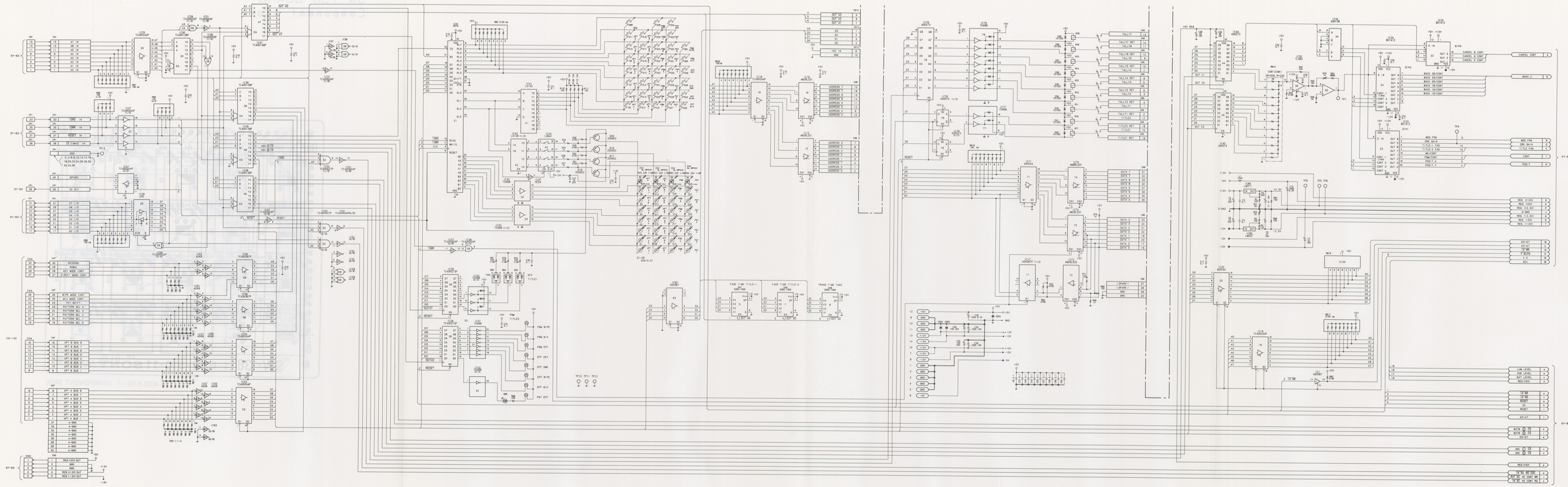


1-620-509-12 COMPONENT SIDE

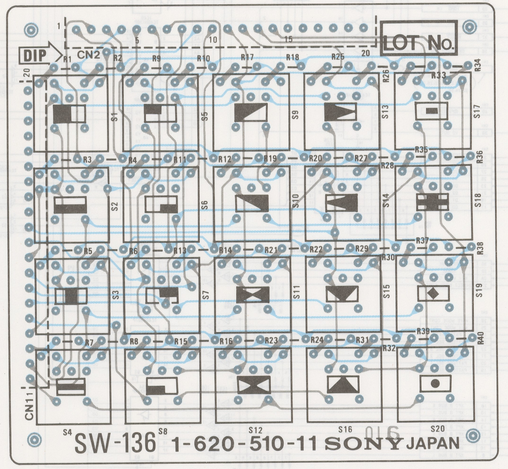
KY-99 1-620-509-12

CN1	A-9	D16	B-7	IC36	J-9	RB1	M-2	S21	C-10		
CN3	A-7	D17	C-7	IC37	B-11	RB2	P-2	S22	D-10		
CN4	J-3	D18	D-7	IC39	C-11	RB3	V-2	S23	E-10		
CN5	W-7	D19	E-7	IC41	D-11	RB4	X-3	S24	F-10		
CN6	W-6	D20	F-7	IC42	D-12	RB5	D-7	S25	H-10		
CN7	N-6	D21	H-7	IC43	E-12	RB6	W-2	S26	K-10		
CN8	N-1	D22	A-12	IC44	F-11	RB7	B-8	S27	B-12		
CN9	R-3	D23	B-12	IC45	F-11	RB8	B-9	S28	C-12		
CN10	U-3	D24	C-12	IC47	J-10	RB9	B-10	S29	C-12		
CN11	W-1	D25	D-12	IC48	J-11	RB10	F-9	S30	D-12		
CN12	U-7	D26	E-12	IC49	J-12	RB11	N-6	S31	E-12		
CN13	Y-7	D27	F-12	IC51	K-12	RB12	N-6	S32	F-12		
CN14	N-12	D28	H-12	IC52	L-12	RB13	N-6	S33	H-12		
CN15	R-6	D29	P-11	IC53	L-10	RB14	N-7	S34	K-12		
CN16	K-5	D30	P-11	IC54	L-11	RB15	W-10	S35	M-5		
CN17	K-4	D31	P-11	IC55	M-10	RB16	W-10	S36	N-5		
CN18	K-3	D32	P-11	IC56	M-11	RB17	B-1	S37	N-5		
CN19	K-2	D33	V-7	IC57	M-10	RB18	B-1	S38	P-5		
CN20	K-1	D34	V-8	IC58	M-11	RB19	U-6	S39	M-6		
CN21	K-1	D35	V-7	IC59	M-12	RB20	X-5	S40	M-6		
CN25	J-1	D36	V-8	IC60	N-10			S41	M-7		
CN26	K-1	D37	W-8	IC61	N-10	RV1	L-1	S42	P-6		
CN27	J-2	D38	W-8	IC62	P-10	RV2	M-1	S43	P-6		
CN28	K-2	D39	W-9	IC63	P-5	RV3	S-1	S44	N-6		
CN29	J-3	D40	X-8	IC64	R-6	RV4	T-1	S45	M-8		
CN30	K-3	D41	X-9	IC65	R-7	RV5	J-9	S46	M-8		
CN31	C-5	D42	J-6	IC66	R-7	RV6	S-6	S47	P-8		
CN32	C-5	D43	J-7	IC67	R-11	RV7	T-6	S48	M-9		
CN33	C-5	D44	L-10	IC68	S-8	RV8	U-6	S49	N-9		
CN34	C-5	D45	L-12	IC69	S-9	RV9	S-7	S50	P-9		
CN35	C-5	D46	X-9	IC70	T-10	RV10	T-7	S51	P-11		
CN36	D-5	D47	P-8	IC71	V-6	RV11	U-7	S52	U-9		
CN37	D-5	D48	N-11	IC72	V-6	RV12	V-8	S53	V-9		
CN38	D-5	D49	V-11	IC73	W-6	RV14	T-9	S54	W-9		
CN39	D-5			IC74	X-6	RV16	X-11	S55	X-9		
CN40	D-5	IC1	M-4	IC75	X-6	RV17	R-5	S56	U-9		
CN41	D-5	IC2	N-2	IC76	X-8	RV18	R-5	S57	U-10		
CN42	D-5	IC3	P-2	IC77	T-8			S58	U-11		
CN43	D-5	IC4	P-3	IC78	V-9	RY1	U-7	S59	V-10		
CN44	E-5	IC5	P-3	IC79	W-9	RY2	V-7	S60	V-11		
CN45	E-5	IC6	P-4	IC81	X-10	RY3	U-8	S61	U-11		
CN46	E-5	IC7	P-4	IC82	X-12	RY4	V-8	S62	U-12		
CN47	E-5	IC8	U-1	IC83	X-12	RY5	W-8	S63	W-11		
CN48	E-5	IC9	V-2	IC85	P-10	RY6	W-8	S64	W-12		
CN49	E-5	IC11	W-2	IC86	P-10	RY7	X-8	S65	N-12		
CN50	E-5	IC12	X-1	IC87	R-10	RY8	W-9	S66	B-1		
CN51	F-5	IC13	X-2	IC88	R-10	RY9	X-9				
CN52	F-5	IC14	X-3	IC89	M-2			TP1	J-8		
CN53	F-5	IC15	V-5	IC90	M-2	S1	S-2	TP2	P-8		
CN54	F-5	IC16	W-5	IC91	T-10	S2	T-2	TP3	R-9		
CN55	D-5	IC17	X-5			S3	U-2	TP4	F-6		
		IC18	X-5	Q3	P-1	S4	U-2	TP5	M-1		
D1	A-5	IC19	B-6	Q4	P-1	S5	B-5	TP6	M-3		
D2	B-5	IC20	B-7	Q5	P-2	S6	C-5	TP7	U-10		
D3	C-5	IC21	E-6	Q6	P-2	S7	C-5	TP8	R-9		
D4	D-5	IC22	H-6	Q7	P-2	S8	D-5	TP9	M-3		
D5	E-6	IC23	H-6	Q8	W-2	S9	E-5	TP10	C-13		
D8	A-7	IC24	H-7	Q9	X-2	S10	F-5	TP11	M-12		
D9	B-7	IC25	B-8	Q10	W-3	S11	H-5	TP13	A-10		
D6	F-6	IC26	B-9	Q11	X-3	S12	B-7				
D7	H-6	IC27	B-9	Q12	W-3	S13	C-7	TP12	G-11		
D10	C-7	IC28	D-8	Q13	X-3	S14	C-7				
D11	D-7	IC29	D-9	Q14	W-4	S15	D-7	VDR1	R-7		
D12	E-7	IC30	D-9	Q15	W-3	S16	E-7	VDR2	R-7		
D13	F-7	IC31	F-8	Q16	E-11	S17	F-7	VDR3	J-8		
D14	H-7	IC32	F-9	Q17	E-11	S18	H-7	VDR4	J-8		
D15	A-7	IC33	F-9	Q18	E-11	S19	B-10	VDR5	J-8		
		IC34	H-9	Q20	E-11	S20	C-10				
		IC35	H-8								

KY-99 (1/3) BOARD
KEY/DISPLAY CONTPOLLER

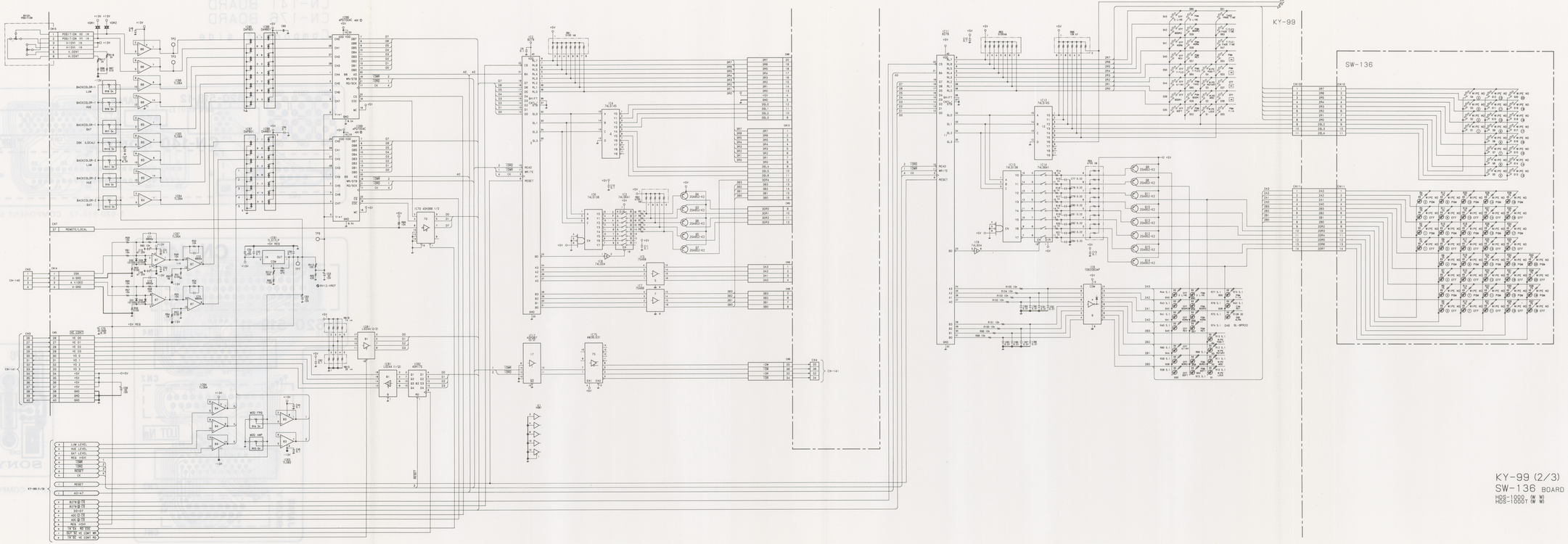


SW-136 BOARD
Component side



1-620-510-11 COMPONENT SIDE

KY-99 (2/3) BOARD
SW-136 BOARD
KEY/DISPLAY CONTROLLER



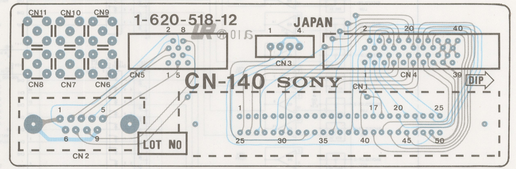
HDS-1000
HDS-1000T
KY-99 (2/3), SW-136
KY-99 (2/3), SW-136
HDS-1000
HDS-1000T

KY-99

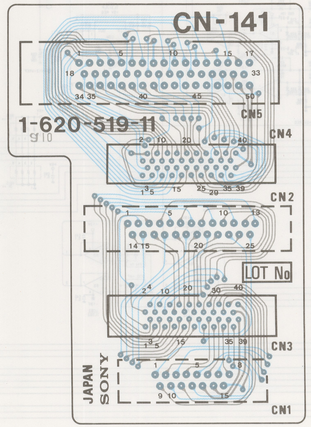
SW-136

KY-99 (2/3) BOARD
SW-136 BOARD
HDS-1000 (W W)
HDS-1000T (W W)

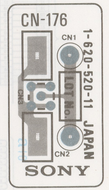
CN-140 BOARD
CN-141 BOARD
CN-176 BOARD
Component side



1-620-518-12 COMPONENT SIDE

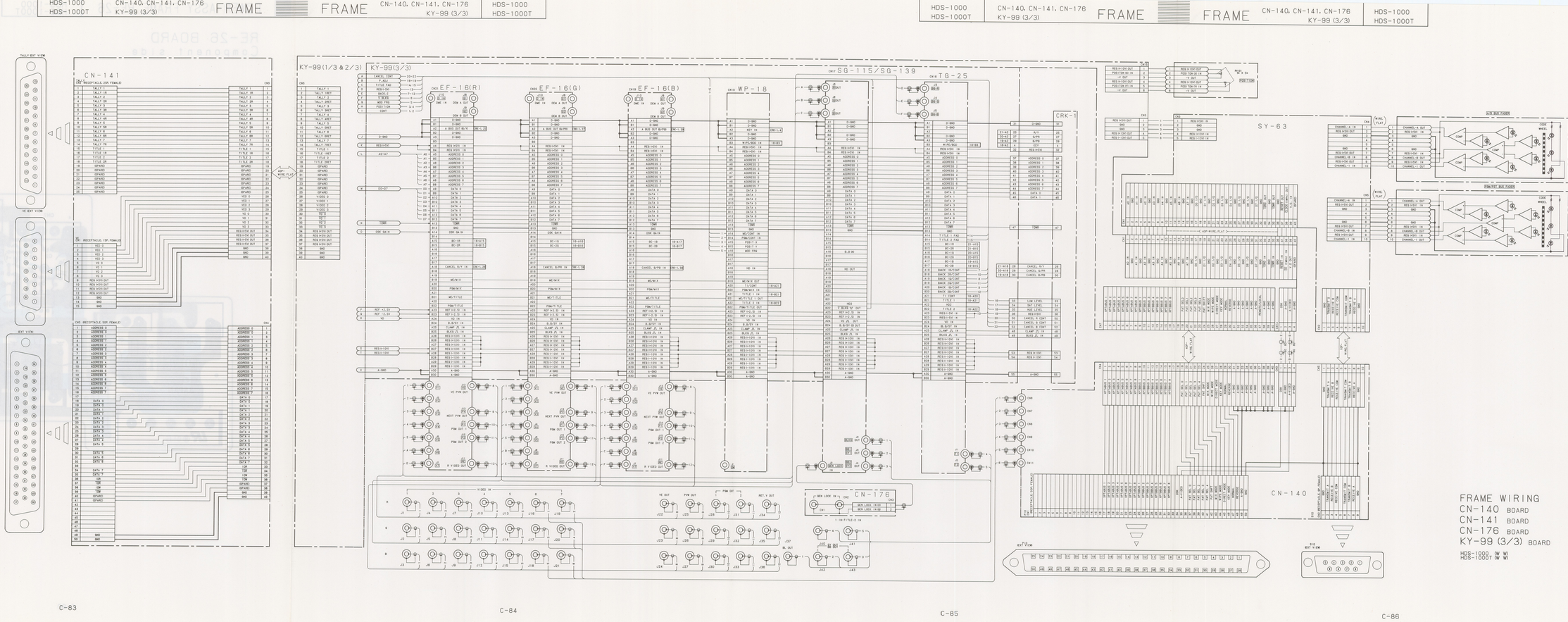


1-620-519-11 COMPONENT SIDE



1-620-520-11 COMPONENT SIDE

FRAME
CN-140 BOARD
CN-141 BOARD
CN-176 BOARD
CONNECTION BOARD
KY-99 (3/3) BOARD
KEY/DISPLAY
CONTROLLER

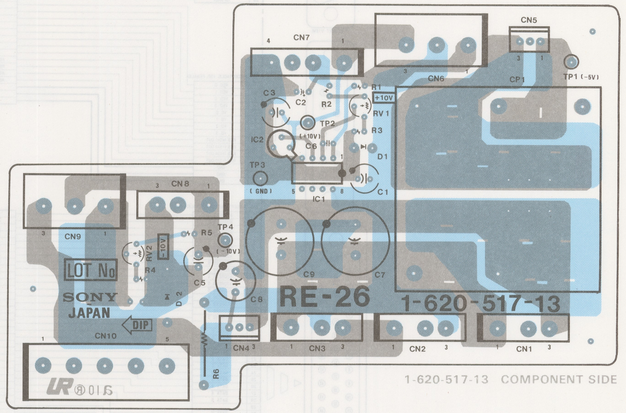


FRAME WIRING
CN-140 BOARD
CN-141 BOARD
CN-176 BOARD
KY-99 (3/3) BOARD

HDS-1000 (W W)
HDS-1000T (W W)

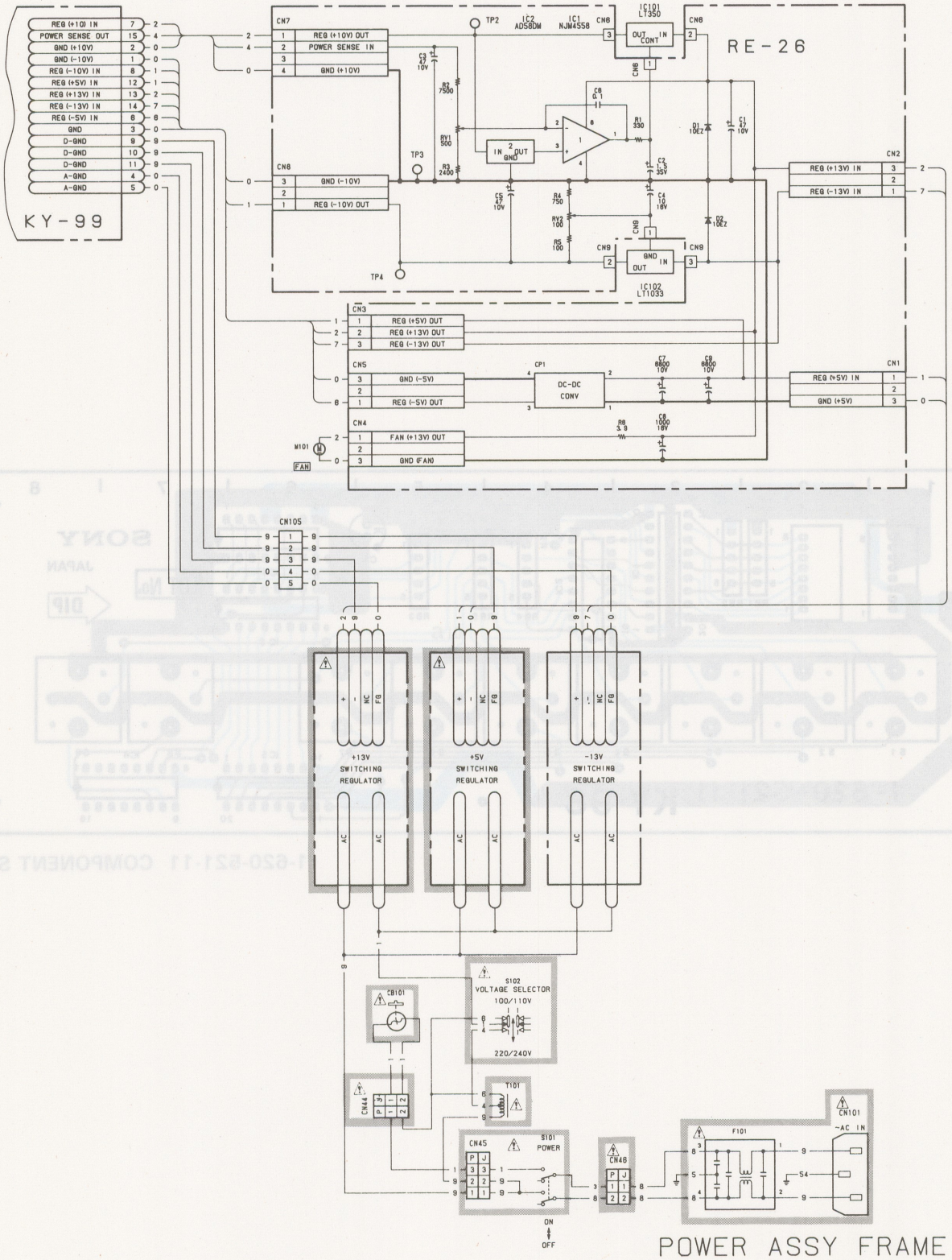
HDS-1000 (W W)
HDS-1000T (W W)
C-83
C-84
C-85
C-86

RE-26 BOARD
Component side



1-620-517-13 COMPONENT SIDE

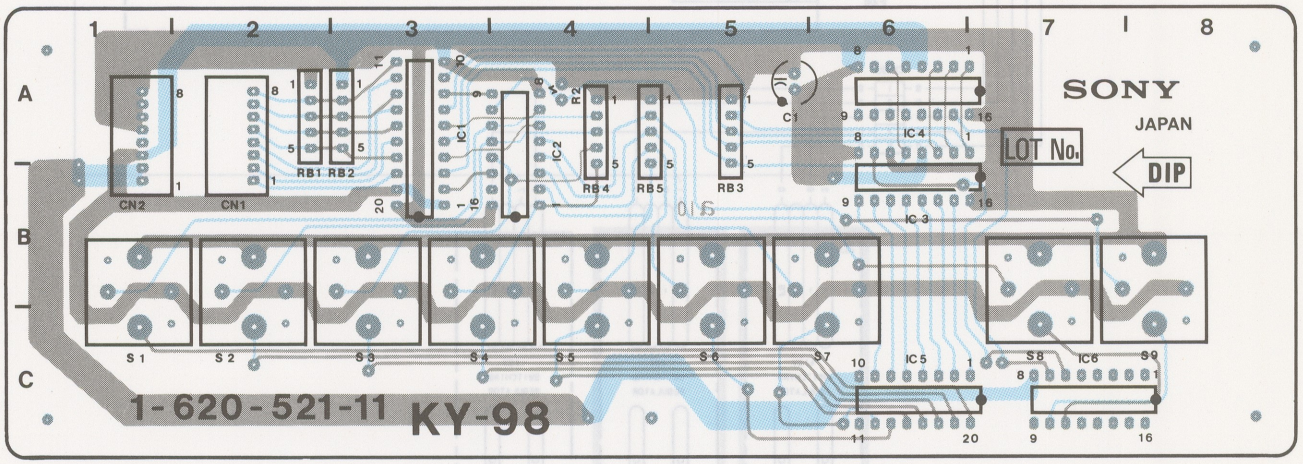
POWER ASSY FRAME
RE-26 BOARD



POWER ASSY FRAME
RE-26 BOARD
HDS-1000 (W W)
HDS-1000T (W W)

KY-98 BOARD

Component side

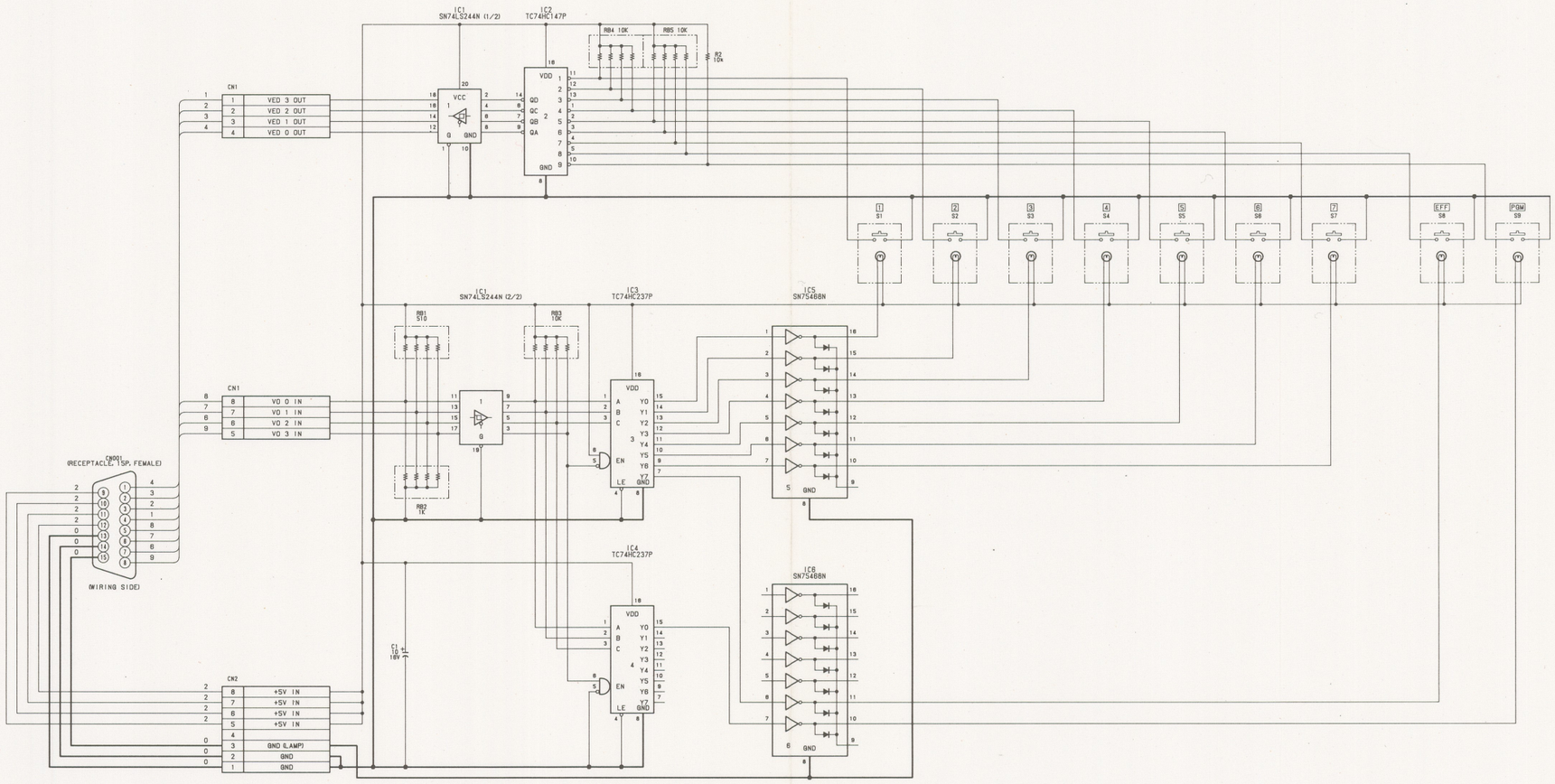


1-620-521-11 COMPONENT SIDE

HDS-1000 HDS-1000T	KY-98	KY-98	HDS-1000 HDS-1000T

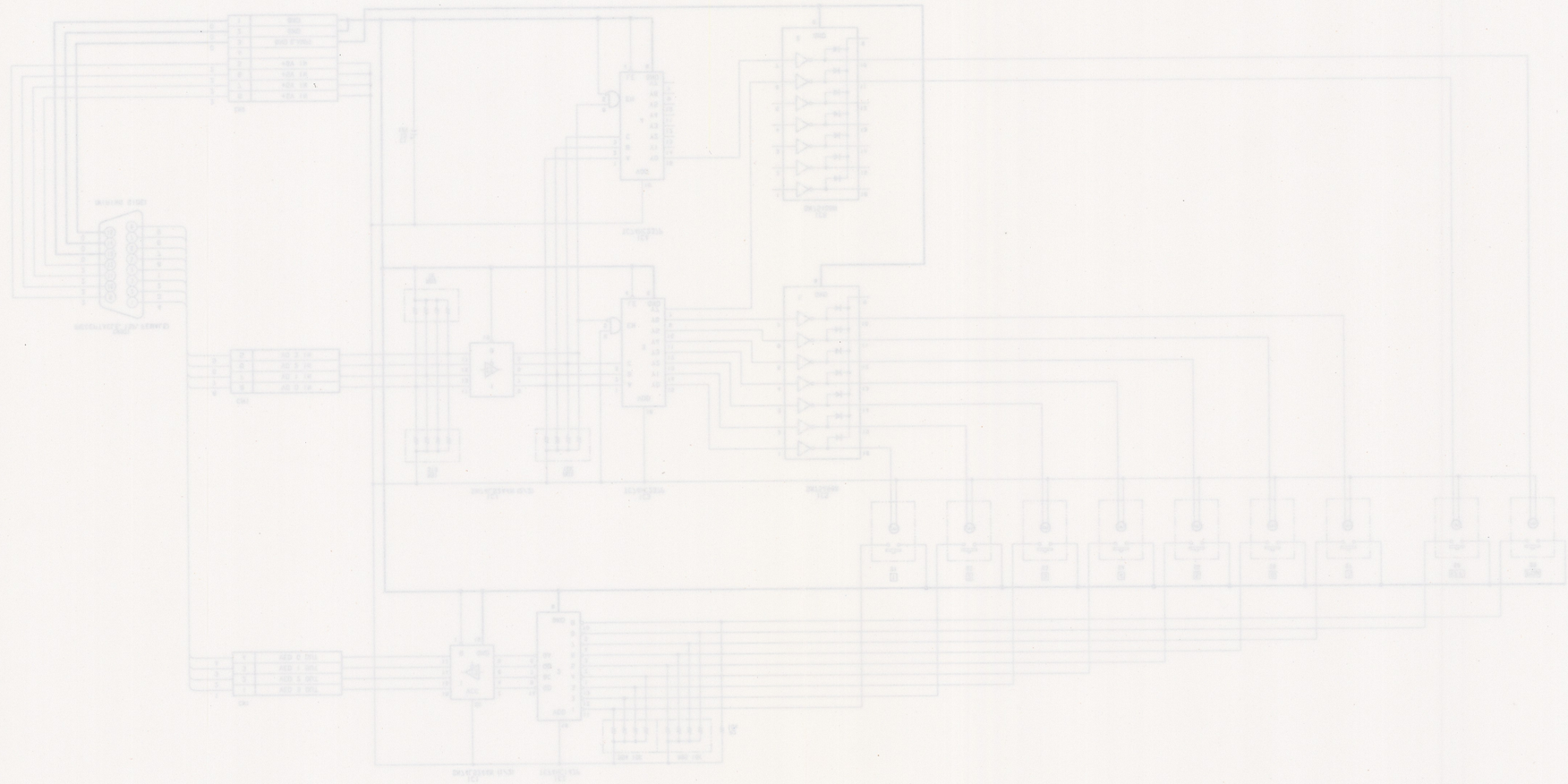
KY-98 BOARD

REMOTE-VIDEO SELECTOR



KY-98 BOARD

HDS-1000 (W W)
HDS-1000T (W W)



SECTION D
SPARE PARTS

D-1. PARTS INFORMATION

1. **Safety Related Component Warning**

   Components identified by shading marked with ⚠ on the schematic diagrams, exploded views and electrical spare parts list are critical to safe operation. Replace these components with Sony parts whose parts numbers appear as shown in this manual or in service bulletins and service manual supplements published by Sony.

2. Replacement Parts supplied from Sony Parts Center will sometimes have different shape and outside view from the parts which actually in use. This is due to **"accommodating the improved parts and/or engineering changes"** or **"standardization of genuine parts."**

   - This manual's exploded views and electrical spare parts lists are indicating the parts numbers of "the standardized genuine parts at present".
   - Regarding engineering parts changes in our engineering department, refer Sony service bulletins and service manual supplements.

3. **Printed Components in Bold-Face type** on the exploded views and electrical spare parts list are normally stocked for replacement purposes. The remaining parts are not normally required for routine service work. Orders for parts not shown in Bold-Face type will be processed, but allow for additional delivery time.

4. Item with no part number and/or no description are not stocked because they are seldom required for routine service.

5. **Abbreviation**

REF. NO.	DESCRIPTION	REF. NO.	DESCRIPTION	REF. NO.	DESCRIPTION
BT	BATTERY	**EL**	FILTER	**RV**	VARIABLE RESISTOR
C	CAPACITOR	**IC**	IC	**RY**	RELAY
CN	CONNECTOR	**L**	INDUCTOR	**S**	SWITCH
CV	VARIABLE CAPACITOR	**M**	FAN	**T**	TRANSFORMER
D	DIODE	**Q**	TRANSISTOR	**X**	OSCILLATOR
DL	DELAY LINE	**R**	RESISTOR		
FB	FERRITE BEADRING	**RB**	RESISTER BLOCK		

All capacitors are in micro farads unless otherwise specified.
All inductors are in micro henries unless otherwise specified.
All resistors are in ohms.

PRECISION +K Cr-N — 7-627-□□□-□□

SIZE	Parts No.
1.7 x 1.8	–
x 2	–
x 2.2	–
x 2.5	–
x 2.8	–
x 3	–
x 3.5	–
x 4	–
x 4.5	–
x 5	–
x 5.5	–
x 6	–
2 x 2	452-07
x 2.2	452-87
x 2.5	–
x 2.8	–
x 3	452-17
x 3.5	–
x 4	452-27
x 4.5	–
x 5	–
x 5.5	–
x 6	–
x 7	452-67
x 8	–
2.6 x 3.5	–
x 4	454-17
x 4.5	–
x 5	454-37
x 5.5	–
x 6	–
x 7	–
x 8	–

+P Ni-N — 7-621-□□□-□□

SIZE	Parts No.
2 x 3	255-12
x 4	255-22
x 5	255-32
x 6	255-42
x 8	255-52
x 10	255-62
x 12	255-72
x 14	–
x 16	–
x 20	–
2.3 x 5	–
x 6	–
x 8	–
x 10	–
x 12	–
x 14	–
x 16	–
x 20	–
2.6 x 3	259-12
x 4	259-22
x 5	259-32
x 6	259-42
x 8	259-52
x 10	259-62
x 12	259-72
x 14	259-82
x 16	260-02
x 20	260-22

+B Bzn-N — 7-682-□□□-□□

SIZE	Parts No.
3 x 3	544-09
x 4	545-09
x 5	546-09
x 6	547-09
x 8	548-09
x 10	549-09
x 12	550-09
x 14	551-09
x 16	552-09
x 20	553-09
x 30	555-09
4 x 4	558-09
x 5	559-09
x 6	560-09
x 8	561-09
x 10	562-09
x 12	563-09
x 14	564-09
x 16	565-09
x 20	566-09

+K Bzn-N — 7-621-□□□-□□

SIZE	Parts No.
2 x 3	555-10
x 4	591-00
x 5	555-30
x 6	555-40
x 8	555-50
x 10	555-60
x 12	555-70
x 14	–
x 16	–
x 20	–
2.6 x 4	559-20
x 5	559-30
x 6	592-00
x 8	592-10
x 10	592-20
x 12	592-30
x 14	559-00
x 16	560-00
x 20	560-20

+PWH — 7-682-□□□-□□

SIZE	Parts No.
2.6 x 4	
x 5	902-11
x 6	902-21
x 8	902-31
x 10	
x 12	902-51
x 14	
3 x 5	903-01
x 6	903-11
x 8	903-21
x 10	903-31
x 12	903-41
x 14	
4 x 6	904-01
x 8	904-11
x 10	904-21
x 12	904-31
x 14	904-41
x 16	
x 20	

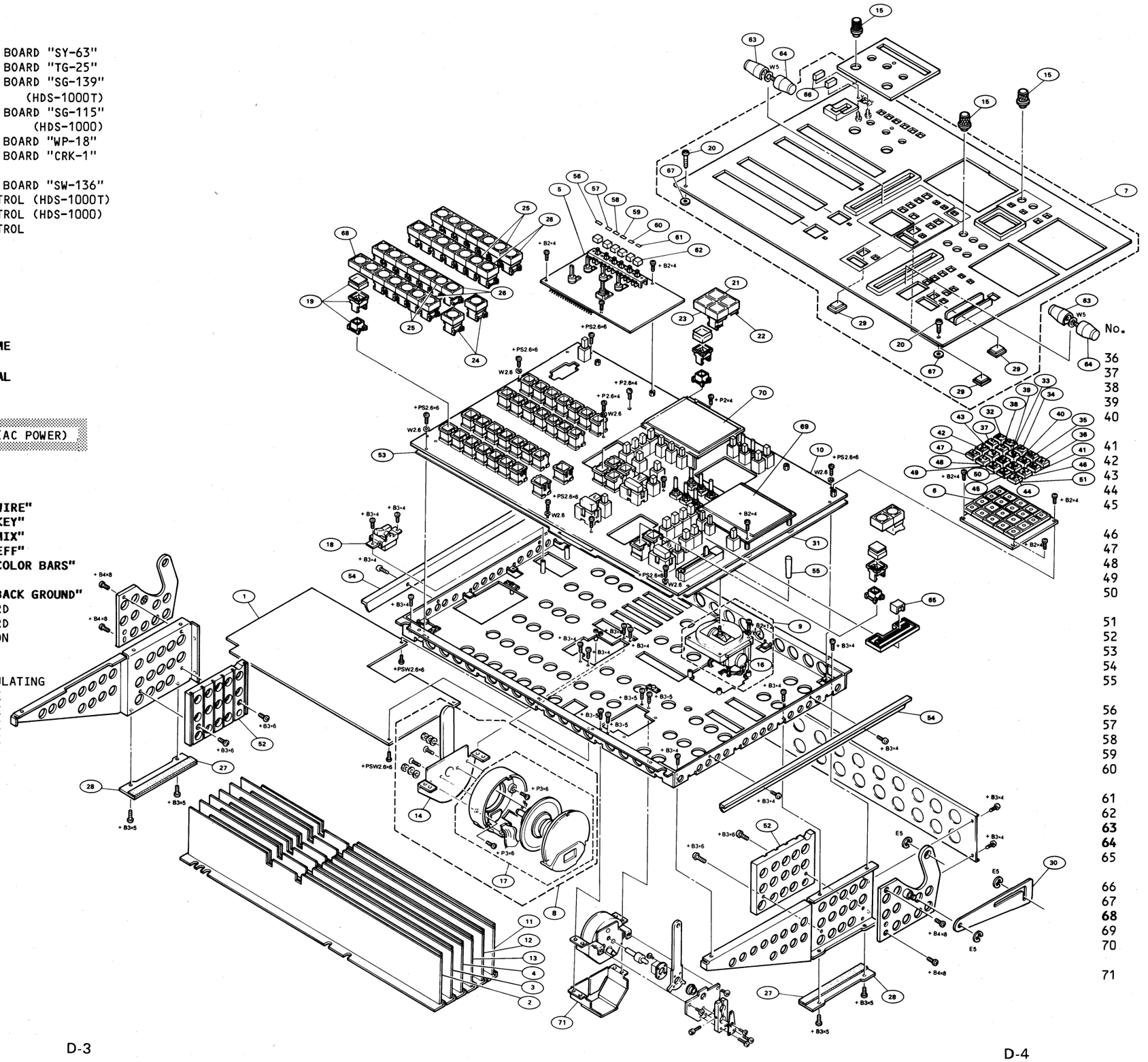
+K Bzn-N — 7-682-□□□-□□

SIZE	Parts No.
3 x 4	245-09
x 5	246-09
x 6	247-09
x 8	248-09
x 10	249-09
x 12	250-09
x 14	251-09
x 16	252-09
x 20	253-09
4 x 6	260-09
x 8	261-09
x 10	262-09
x 12	263-09
x 14	264-09
x 16	265-09
x 20	266-09

XPLODED VIEW

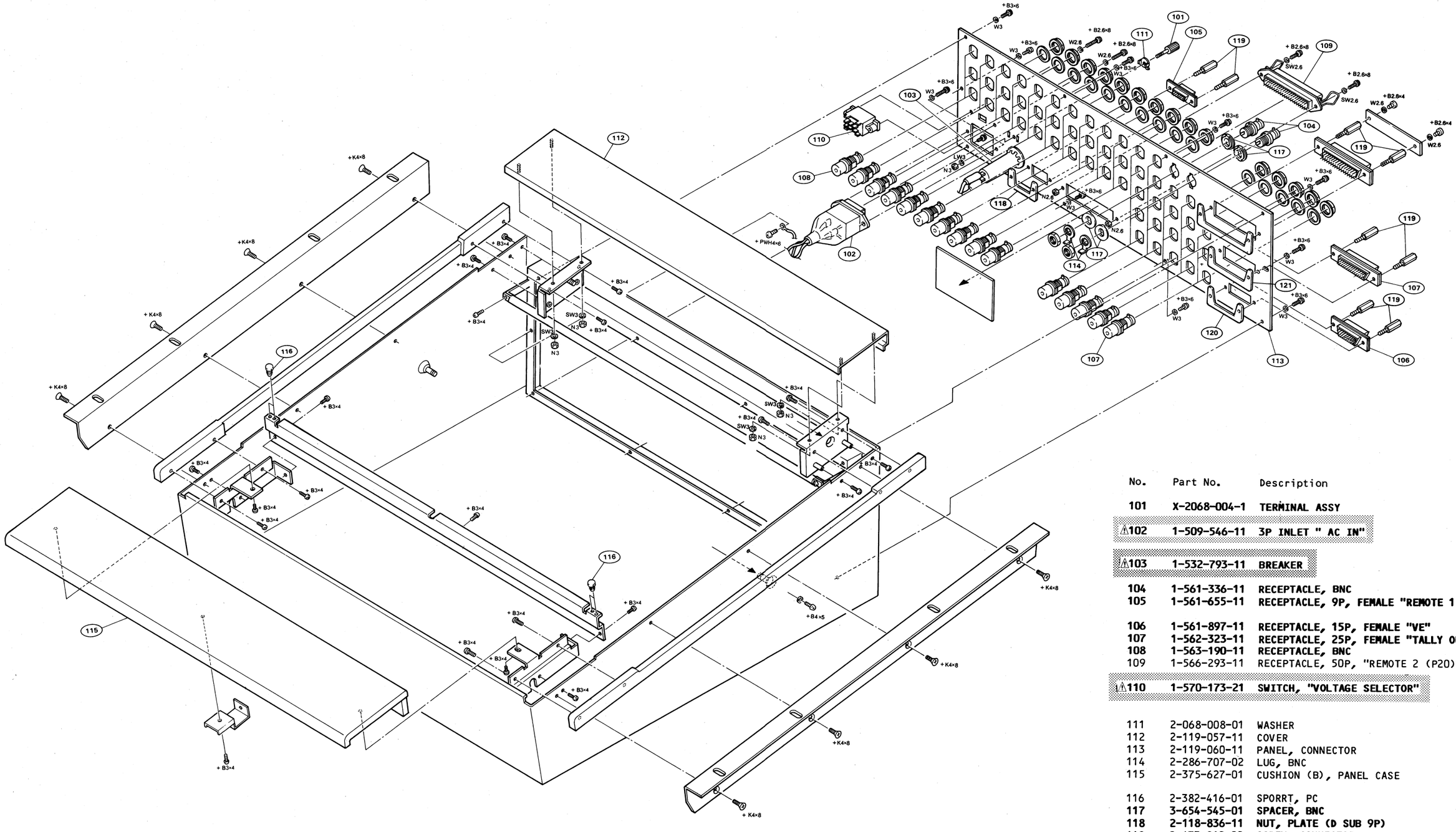
ROL PANEL ASSY

Part No.	Description
A-7513-468-A	MOUNTED CIRCUIT BOARD "SY-63"
A-7513-469-A	MOUNTED CIRCUIT BOARD "TG-25"
A-7513-641-A	MOUNTED CIRCUIT BOARD "SG-139" (HDS-1000T)
A-7513-641-A	MOUNTED CIRCUIT BOARD "SG-115" (HDS-1000)
A-7513-473-A	MOUNTED CIRCUIT BOARD "WP-18"
A-7513-477-A	MOUNTED CIRCUIT BOARD "CRK-1"
A-7513-479-A	MOUNTED CIRCUIT BOARD "SW-136"
A-7605-068-A	PANEL ASSY, CONTROL (HDS-1000T)
A-7605-068-A	PANEL ASSY, CONTROL (HDS-1000)
A-7612-290-A	FADER ASSY, CONTROL
A-7612-291-A	STICK ASSY, JOY
A-7615-189-A	KY-99 ASSY
A-7615-191-A	EF-16 ASSY (R)
A-7615-192-A	EF-16 ASSY (G)
A-7615-193-A	EF-16 ASSY (B)
X-2119-001-1	BRACKET ASSY
X-2119-002-1	**KNOB ASSY, VOLUME**
1-237-495-11	**RES, VAR, SPECIAL (JOY STICK) 5K**
1-464-742-11	**ENCODER, ROTARY**
1-570-743-11	SWITCH, SEESAW (AC POWER)
1-570-516-91	SWITCH, PUSH
2-112-879-01	SCREW, COIN
2-119-002-01	**PANEL, SWITCH "WIRE"**
2-119-002-11	**PANEL, SWITCH "KEY"**
2-119-022-21	**PANEL, SWITCH "MIX"**
2-119-002-31	**PLATE, SWITCH "EFF"**
2-119-002-51	**PLATE, SWITCH "COLOR BARS"**
2-119-002-61	**PLATE, SWITCH "BACK GROUND"**
2-119-003-01	CUSHION, PC BOARD
2-119-006-01	STOPPER, PC BOARD
2-119-007-01	PANEL, INDICATION
2-119-014-01	STAY
2-119-025-01	SPACER (B), INSULATING
2-119-039-02	KEYTOP (1), WIPE
2-119-039-12	KEYTOP (1), WIPE
2-119-039-22	KEYTOP (1), WIPE
2-119-039-32	KEYTOP (1), WIPE



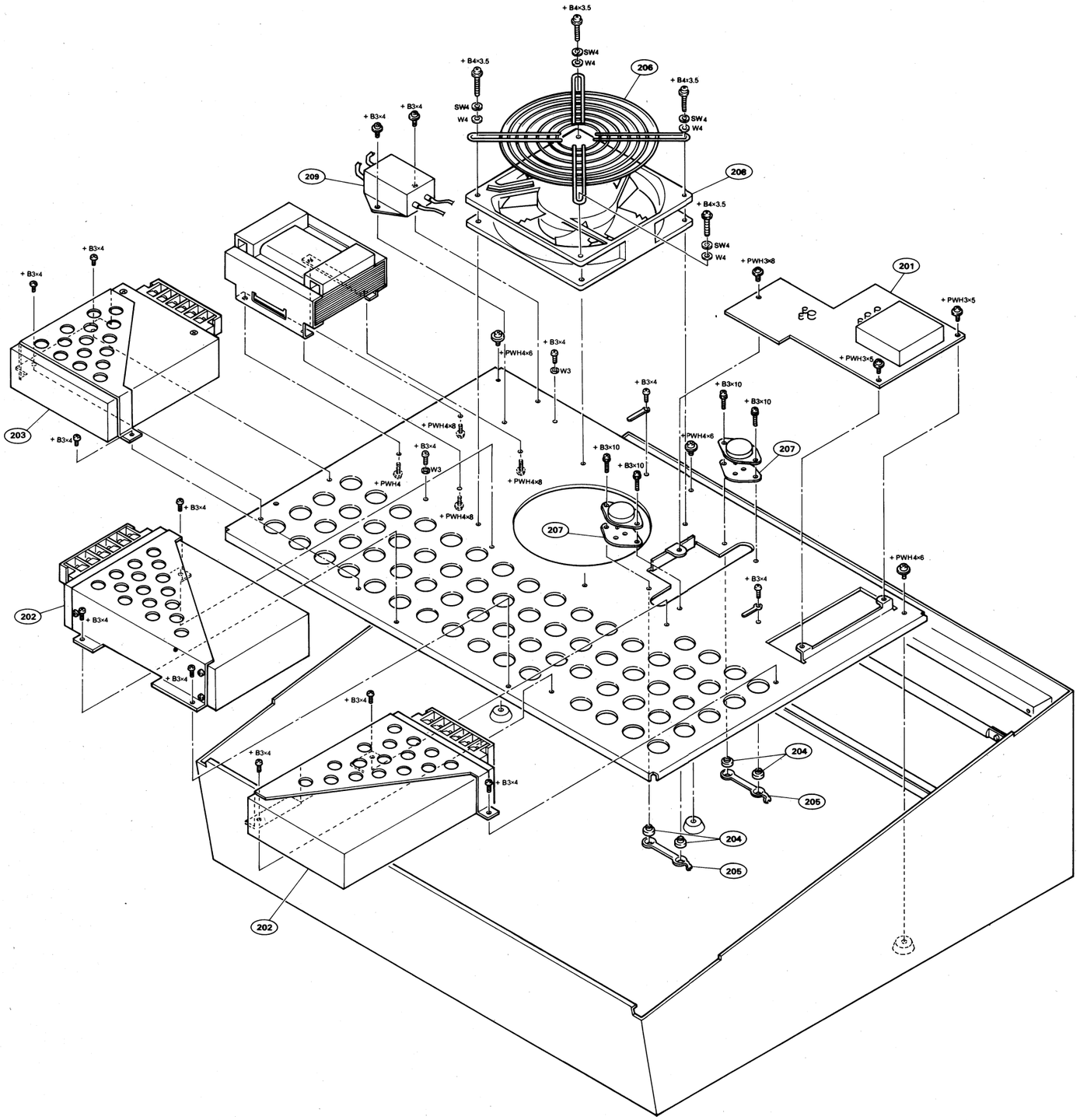
No.	Part No.	Description
36	2-119-039-42	KEYTOP (1), WIPE
37	2-119-039-52	KEYTOP (1), WIPE
38	2-119-039-62	KEYTOP (1), WIPE
39	2-119-039-72	KEYTOP (1), WIPE
40	2-119-039-82	KEYTOP (1), WIPE
41	2-119-039-92	KEYTOP (1), WIPE
42	2-119-040-02	KEYTOP (1), WIPE
43	2-119-040-12	KEYTOP (1), WIPE
44	2-119-040-22	KEYTOP (1), WIPE
45	2-119-040-32	KEYTOP (1), WIPE
46	2-119-040-42	KEYTOP (1), WIPE
47	2-119-040-52	KEYTOP (1), WIPE
48	2-119-040-62	KEYTOP (1), WIPE
49	2-119-040-72	KEYTOP (1), WIPE
50	2-119-040-82	KEYTOP (1), WIPE
51	2-119-040-92	KEYTOP (1), WIPE
52	2-119-042-01	RAIL
53	2-119-050-01	SPACER (A), INSULATING
54	2-119-056-11	ANGLE, FITTING
55	2-119-072-02	KNOB, JOYSTCK
56	2-119-075-01	SHEET, COLOR (MAGENTA)
57	2-119-075-11	SHEET, COLOR (RED)
58	2-119-075-21	SHEET, COLOR (YELLOW)
59	2-119-075-31	SHEET, COLOR (GREEN)
60	2-119-075-41	SHEET, COLOR (CYAN)
61	2-119-075-51	SHEET, COLOR (BLUE)
62	2-119-076-01	KEY, TOP
63	**2-389-719-11**	**KNOB (A), LEVER**
64	**2-389-720-11**	**KNOB (B), LEVER**
65	2-389-734-01	KNOB, SLIDE VR
66	2-295-991-00	GUARD, SWITCH
67	3-650-537-00	WASHER
68	**3-707-232-01**	**COVER, TRANSPARENT**
69	2-119-004-11	COVER, PSM
70	2-119-005-11	COVER, DME
71	2-119-084-01	CASE SHIELD

REAR PANEL ASSY



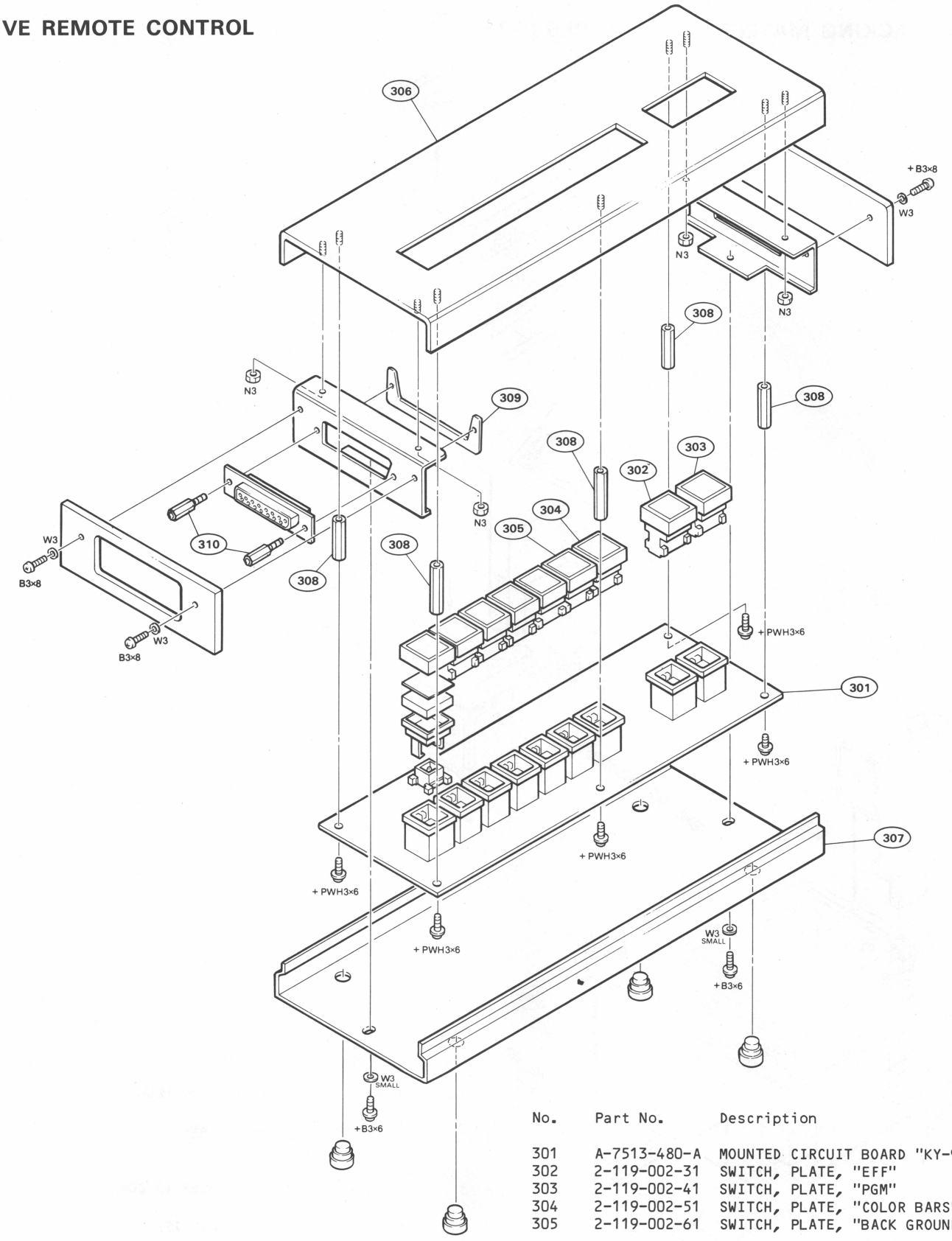
No.	Part No.	Description
101	**X-2068-004-1**	**TERMINAL ASSY**
⚠102	**1-509-546-11**	**3P INLET " AC IN"**
⚠103	**1-532-793-11**	**BREAKER**
104	**1-561-336-11**	**RECEPTACLE, BNC**
105	**1-561-655-11**	**RECEPTACLE, 9P, FEMALE "REMOTE 1 (S10)"**
106	**1-561-897-11**	**RECEPTACLE, 15P, FEMALE "VE"**
107	**1-562-323-11**	**RECEPTACLE, 25P, FEMALE "TALLY OUT"**
108	**1-563-190-11**	**RECEPTACLE, BNC**
109	1-566-293-11	RECEPTACLE, 50P, "REMOTE 2 (P20)"
⚠110	**1-570-173-21**	**SWITCH, "VOLTAGE SELECTOR"**
111	2-068-008-01	WASHER
112	2-119-057-11	COVER
113	2-119-060-11	PANEL, CONNECTOR
114	2-286-707-02	LUG, BNC
115	2-375-627-01	CUSHION (B), PANEL CASE
116	2-382-416-01	SPORRT, PC
117	**3-654-545-01**	**SPACER, BNC**
118	**2-118-836-11**	**NUT, PLATE (D SUB 9P)**
119	2-673-910-00	SCREW, CONNECTOR
120	3-659-858-00	NUT, LEAF (D-15)
121	4-604-023-11	NUT, PLATE (D-25)

CHASSIS ASSY



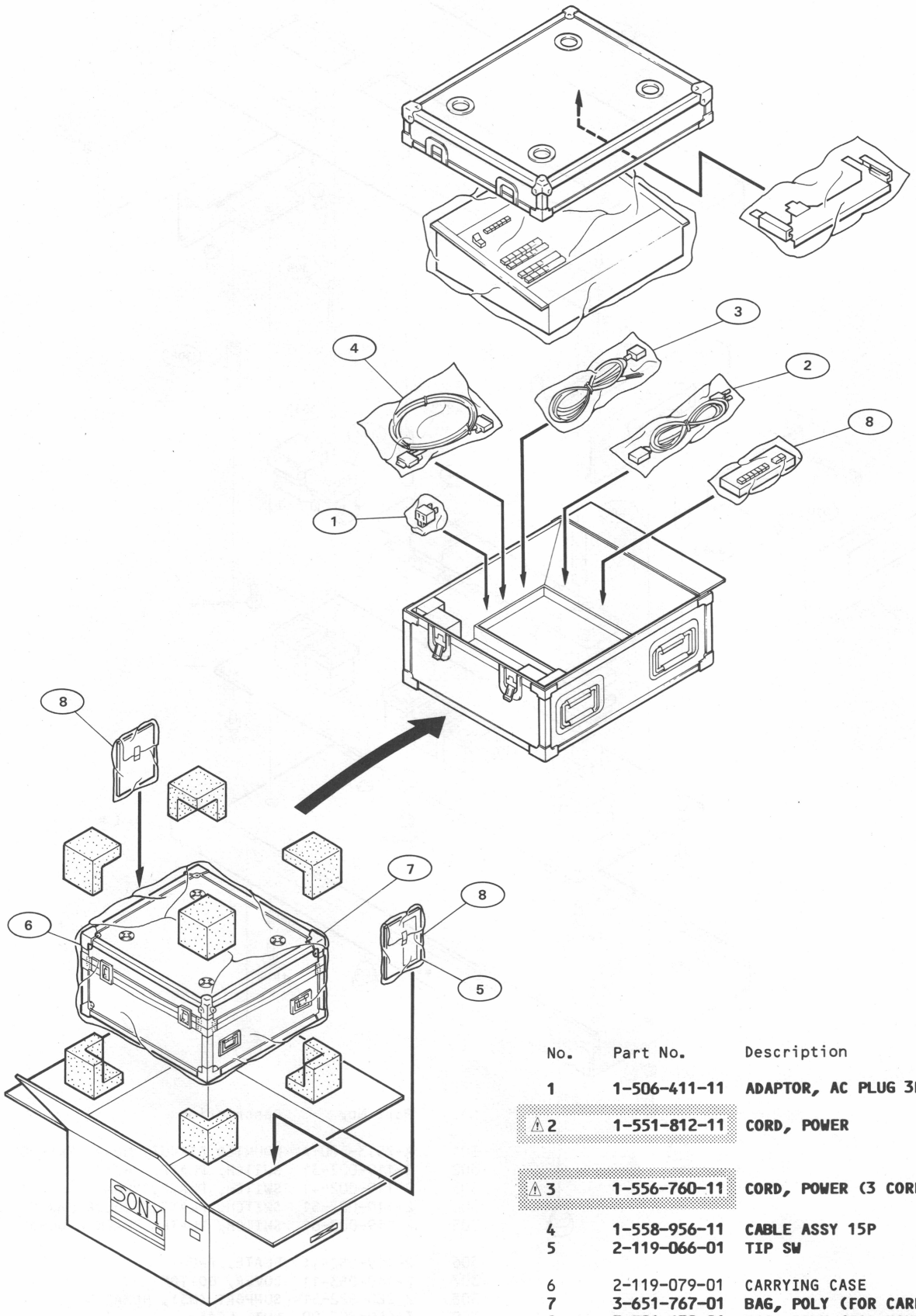
No.	Part No.	Description
201	A-7513-475-A	MOUNTED CIRCUIT BOARD "RE-26"
⚠202	1-413-271-11	**REGULATOR, SWITCHING (ES-10-12)**
⚠203	1-413-272-11	**REGULATOR, SWITCHING (ES-9-5)**
204	**2-832-003-00**	**BUSH, INSULATING**
205	**3-646-806-00**	**NUT, (A)**
206	3-691-481-01	GUARD, FINGER
207	4-848-640-11	PLATE, INSULATING, TO-3
208	**8-838-100-01**	**MOTOR, DC (BHR-3200A)**
⚠209	1-421-931-11	**FILTER, NOISE**

VE REMOTE CONTROL



No.	Part No.	Description
301	A-7513-480-A	MOUNTED CIRCUIT BOARD "KY-98"
302	2-119-002-31	SWITCH, PLATE, "EFF"
303	2-119-002-41	SWITCH, PLATE, "PGM"
304	2-119-002-51	SWITCH, PLATE, "COLOR BARS"
305	2-119-002-61	SWITCH, PLATE, "BACK GROUND"
306	2-119-052-11	PLATE, FRONT
307	2-119-053-11	COVER, BOTTOM
308	2-280-622-51	SUPPORT (M3), HEXAGON
309	3-659-858-00	NUT, LEAF
310	3-673-910-00	SCREW, CONNECTOR

D-3. PACKING MATERIAL AND ACCESSORY



No.	Part No.	Description
1	1-506-411-11	**ADAPTOR, AC PLUG 3P-2P**
⚠2	1-551-812-11	**CORD, POWER**
⚠3	1-556-760-11	**CORD, POWER (3 CORE)**
4	1-558-956-11	**CABLE ASSY 15P**
5	2-119-066-01	**TIP SW**
6	2-119-079-01	CARRYING CASE
7	3-651-767-01	**BAG, POLY (FOR CARRYING CASE)**
8	3-701-630-01	**BAG, POLY (FOR MANUAL)**

D-4. ELECTRICAL PARTS LIST

CAPACITOR

Parts that are not listed in the "reference numbers order list" are shown in following table.
Reference numbers are omitted.

CERAMIC CAPACITOR 0.5 pF through 820 pF
50WV

Value	Parts No.
0.5 pF	1-101-837-00
1	1-102-934-00
1.5	1-101-576-00
2	1-102-935-00
3	1-102-936-00
4	1-102-937-00
5	1-102-942-00
6	1-102-943-00
7	1-102-944-00
8	1-102-945-00
9	1-102-946-00
10	1-102-947-00
11	1-102-948-00
12	1-102-949-00
13	1-102-950-00
15	1-102-951-00
16	1-102-952-00
18	1-102-953-00
20	1-102-958-00
22	1-102-959-00

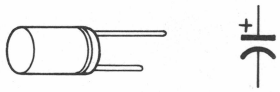
Value	Parts No.
24 pF	1-102-960-00
27	1-102-961-00
30	1-102-962-00
33	1-102-963-00
36	1-102-964-00
39	1-102-965-00
43	1-102-966-00
47	1-101-880-00
51	1-101-882-00
56	1-101-884-00
62	1-101-886-00
68	1-101-888-00
75	1-101-890-00
82	1-102-971-00
91	1-102-972-00
100	1-102-973-00
110	1-102-815-00
120	1-102-816-00
130	1-101-081-00
150	1-101-361-00

Value	Parts No.
160 pF	1-101-367-00
180	1-102-976-00
200	1-102-977-00
220	1-102-978-00
240	1-102-979-00
270	1-102-980-00
300	1-102-981-00
330	1-102-820-00
360	1-102-821-00
390	1-102-822-00
430	1-102-823-00
470	1-102-824-00
510	1-101-059-00
560	1-102-115-00
680	1-102-116-00
820	1-102-117-00

CAPACITOR

Parts that are not listed in the "reference numbers order list" are shown in following table.
Reference numbers are omitted.

ELECTROLYTIC CAPACITOR 0.1μF through 100μF ±20%
4WV through 50WV



Parts No. 1-124-□□□-00

Value		Part No. −□□□−
0.1μF	50V	249
0.15	50	250
0.22	50	251
0.33	50	252
0.47	50	253
0.68	50	254
1	50	255
1.5	50	256
2.2	35	
	50	257
3.3	25	
	35	
	50	258
4.7	16	245

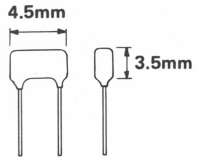
Value		Part No. −□□□−
4.7μF	25V	
	35	245
	50	259
6.8	10	
	16	
	25	239
	35	246
	50	260
10	6.3	
	10	
	16	233
	25	240
	35	247
	50	261

Value		Part No. −□□□−
22μF	6.3V	222
	10	
	16	234
	25	
	35	248
33	4	220
	6.3	
	10	229
	16	
	25	242
47	6.3	224
	10	
	16	236
100	6.3	225

RESISTOR

Parts that are not listed in the "reference numbers order list" are shown in following table.
Reference numbers are omitted.

METAL FILM RESISTOR



± 1%, 1/8W

Parts No. 1-214-□□□-00 (10Ω through 33kΩ)
Parts No. 1-215-□□□-11 (36kΩ through 100kΩ)

Value	Parts No. -□□□-
10Ω	509
11	510
12	511
13	512
15	513
16	514
18	515
20	516
22	517
24	518
27	519
30	520
33	521
36	522
39	523
43	524
47	525
51	526
56	527
62	528
68	529
75	530
82	531
91	532

Value	Parts No. -□□□-
100Ω	533
110	534
120	535
130	536
150	537
160	538
180	539
200	540
220	541
240	542
270	543
300	544
330	545
360	546
390	547
430	548
470	549
510	550
560	551
620	552
680	553
750	554
820	555
910	556

Value	Parts No. -□□□-
1.0kΩ	557
1.1	558
1.2	559
1.3	560
1.5	561
1.6	562
1.8	563
2.0	564
2.2	565
2.4	566
2.7	567
3.0	568
3.3	569
3.6	570
3.9	571
4.3	572
4.7	573
5.1	574
5.6	575
6.2	576
6.8	577
7.5	578
8.2	579
9.1	580

Value	Parts No. -□□□-
10kΩ	581
11	582
12	583
13	584
15	585
16	586
18	587
20	588
22	589
24	590
27	591
30	592
33	593

36kΩ	819
39	820
43	821
47	822
51	823
56	824
62	825
68	826
75	827
82	828
91	829
100	830

RESISTOR

Parts that are not listed in the "reference numbers order list" are shown in following table.
Reference numbers are omitted.

CARBON RESISTOR (1/6W)

±5%, 1/6W, non-special type
2.2Ω through 1MΩ

Parts No. 1-247-□□□-00

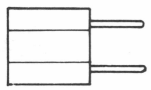
Value	Parts No. −□□□−	Value	Parts No. −□□□−	Value	Parts No. −□□□−	Value	Parts No. −□□□−
1Ω	–	36Ω	796	1.2kΩ	833	43kΩ	870
1.1	–	39	797	1.3	834	47	871
1.2	–	43	798	1.5	835	51	872
1.3	–	47	799	1.6	836	56	873
1.5	–	51	800	1.8	837	62	874
1.6	–	56	801	2	838	68	875
1.8	–	62	802	2.2	839	75	876
2	–	68	803	2.4	840	82	877
2.2	767	75	804	2.7	841	91	878
2.4	768	82	805	3	842	100kΩ	879
2.7	769	91	806	3.3	843	110	880
3	770	100Ω	807	3.6	844	120	881
3.3	771	110	808	3.9	845	130	882
3.6	772	120	809	4.3	846	150	883
3.9	773	130	810	4.7	847	160	884
4.3	774	150	811	5.1	848	180	885
4.7	775	160	812	5.6	849	200	886
5.1	776	180	813	6.2	850	220	887
5.6	777	200	814	6.8	851	240	888
6.2	778	220	815	7.5	852	270	889
6.8	779	240	816	8.2	853	300	890
7.5	780	270	817	9.1	854	330	891
8.2	781	300	818	10kΩ	855	360	892
9.1	782	330	819	11	856	390	893
10Ω	783	360	820	12	857	430	894
11	784	390	821	13	858	470	895
12	785	430	822	15	859	510	896
13	786	470	823	16	860	560	897
15	787	510	824	18	861	620	898
16	788	560	825	20	862	680	899
18	789	620	826	22	863	750	900
20	790	680	827	24	864	820	901
22	791	750	828	27	865	910	902
24	792	820	829	30	866	1MΩ	903
27	793	910	830	33	867		
30	794	1kΩ	831	36	868		
33	795	1.1	832	39	869		

INDUCTOR

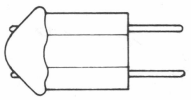
Parts that are not listed in the "reference numbers order list" are shown in following table.
Reference numbers are omitted.

MICRO INDUCTOR 1 μH through 470 μH
±5%

-21



-00



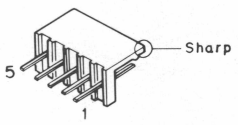
Parts No. 1-408-□□□-□□

Value	Parts No. --□□□–	Value	Parts No. –□□□–	Value	Parts No. –□□□–	Value	Parts No. –□□□–
1 μH	397	4.7 μH	405	22 μH	413	100 μH	421
1.2	398	5.6	406	27	414	120	422
1.5	399	6.8	407	33	415	150	423
1.8	400	8.2	408	39	416	180	424
2.2	401	10	409	47	417	220	425
2.7	402	12	410	56	418	270	426
3.3	403	15	411	68	419	330	427
3.9	404	18	412	82	420	390	428
						470	429

CONNECTOR

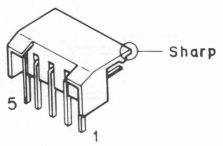
Parts that are not listed in the "reference numbers order list" are shown in following table.
Reference numbers are omitted.

top-type receptacle



2P	1-560-356-00
3P	1-560-357-00
4P	1-560-358-00
5P	1-560-359-00
6P	1-560-360-00
8P	1-560-361-00
10P	1-560-362-00
12P	1-560-363-00

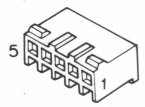
side-type receptacle



2P	1-560-364-00
3P	1-560-365-00
4P	1-560-366-00
5P	1-560-367-00
6P	1-560-368-00
8P	1-560-369-00
10P	1-560-370-00
12P	1-560-371-00

plug

housing



2P	1-561-514-00
3P	1-561-515-00
4P	1-561-516-00
5P	1-561-517-00
6P	1-561-518-00
8P	1-561-519-00
10P	1-561-520-00
12P	1-561-521-00

contact

1-560-372-00

Ref.No.	Part No.	Description
CN-140 BOARD		
	1-620-518-11	PRINTED CIRCUIT BOARD "CN-140"
CN3	1-560-358-00	ILG CONNECTOR POST HEADER 4P
CN4	1-566-291-11	RECEPTACLE, 40P MALE
CN5	1-566-290-11	RECEPTACLE, 10P MALE
CN6	1-561-365-21	CONNECTOR
CN7	1-561-365-21	CONNECTOR
CN8	1-561-365-21	CONNECTOR
CN9	1-561-365-21	CONNECTOR
CN10	1-561-365-21	CONNECTOR
CN11	1-561-365-21	CONNECTOR

Ref.No.	Part No.	Description
CN-141 BOARD		
	1-620-519-11	PRINTED CIRCUIT BOARD "CN-141"
CN3	1-566-291-11	RECEPTACLE, 40P MALE
CN4	1-566-291-11	RECEPTACLE, 40P MALE
CN-176 BOARD		
	1-620-520-11	PRINTED CIRCUIT BOARD "CN-176"
	1-561-365-21	CONNECTOR

Ref.No.	Part No.	Description
CRK-1 BOARD		
	A-7513-477-A	MOUNTED CIRCUIT BOARD "CRK-1"
	1-560-880-11	PLUG 20P, HOUSING 20P
	1-560-880-11	PLUG 20P, HOUSING 20P
C1	1-161-894-00	CERAMIC 0.1 50V
C2	1-161-894-00	CERAMIC 0.1 50V
C9	1-161-894-00	CERAMIC 0.1 50V
C10	1-161-894-00	CERAMIC 0.1 50V
C11	1-101-888-00	CERAMIC 68PF 5% 50V
C20	1-161-894-00	CERAMIC 0.1 50V
C30	1-161-894-00	CERAMIC 0.1 50V
C40	1-161-894-00	CERAMIC 0.1 50V
C46	1-161-894-00	CERAMIC 0.1 50V
C50	1-161-894-00	CERAMIC 0.1 50V
C55	1-161-894-00	CERAMIC 0.1 50V
C56	1-161-894-00	CERAMIC 0.1 50V
C57	1-161-894-00	CERAMIC 0.1 50V
C58	1-161-894-00	CERAMIC 0.1 50V
C59	1-161-894-00	CERAMIC 0.1 50V
C60	1-161-894-00	CERAMIC 0.1 50V
C61	1-161-894-00	CERAMIC 0.1 50V
C62	1-161-894 00	CERAMIC 0.1 50V
C65	1-161-894-00	CERAMIC 0.1 50V
C66	1-161-894-00	CERAMIC 0.1 50V
C67	1-161-894-00	CERAMIC 0.1 50V
C68	1-161-894-00	CERAMIC 0.1 50V
C69	1-161-894-00	CERAMIC 0.1 50V
C71	1-161-894-00	CERAMIC 0.1 50V
C72	1-161-894-00	CERAMIC 0.1 50V
C73	1-161-894-00	CERAMIC 0.1 50V
C74	1-161-894-00	CERAMIC 0.1 50V
C75	1-161-894-00	CERAMIC 0.1 50V
C76	1-161-894-00	CERAMIC 0.1 50V
C80	1-161-894-00	CERAMIC 0.1 50V
C81	1-161-894-00	CERAMIC 0.1 50V
C82	1-161-894-00	CERAMIC 0.1 50V
C83	1-161-894-00	CERAMIC 0.1 50V
C91	1-161-894-00	CERAMIC 0.1 50V
C92	1-161-894-00	CERAMIC 0.1 50V
C94	1-161-894-00	CERAMIC 0.1 50V

Ref.No.	Part No.	Description
D1	8-719-911-19	1SS119
D2	8-719-911-19	1SS119
D3	8-719-911-19	1SS119
D4	8-719-911-19	1SS119
D5	8-719-911-19	1SS119
D6	8-719-812-31	TLR123
D7	8-719-911-19	1SS119
D8	8-719-911-19	1SS119
D9	8-719-911-19	1SS119
D10	8-719-100-21	RD3.9E-B2
D11	8-719-100-21	RD3.9E-B2
IC1	8-759-700-08	NJM4558S: JRC
IC2	8-759-700-08	NJM4558S: JRC
IC3	8-759-015-95	MC1595L: MOTOROLA
IC4	8-759-015-95	MC1595L: MOTOROLA
IC5	8-759-015-95	MC1595L: MOTOROLA
IC6	8-759-917-43	TC74HC138N: TOSHIBA
IC7	8-759-917-43	TC74HC138N: TOSHIBA
IC8	8-759-203-01	TC74HC175P: TOSHIBA
IC9	8-759-112-13	uPC1663: NEC
Q1	8-729-110-53	2SA1005
Q2	8-729-110-53	2SA1005
Q3	8-729-110-53	2SA1005
Q4	8-729-110-53	2SA1005
Q5	8-729-266-83	2SC2668
Q6	8-729-266-83	2SC2668
Q7	8-729-266-83	2SC2668
Q8	8-729-103-19	2SA1206-K1
Q9	8-729-103-19	2SA1206-K1
Q10	8-729-103-19	2SA1206-K1
Q11	8-729-103-19	2SA1206-K1
Q12	8-729-103-19	2SA1206-K1
Q13	8-729-103-19	2SA1206-K1
Q14	8-729-103-19	2SA1206-K1
Q15	8-729-103-19	2SA1206-K1
Q19	8-729-266-83	2SC2668
Q20	8-729-103-19	2SA1206-K1
Q21	8-729-103-19	2SA1206-K1
Q22	8-729-266-83	2SC2668
Q23	8-729-103-19	2SA1206-K1

Ref.No.	Part No.	Description
Q24	8-729-266-83	2SC2668
Q30	8-729-117-54	2SA1175
Q31	8-729-103-19	2SA1206-K1
Q32	8-729-103-19	2SA1206-K1
Q33	8-729-266-83	2SC2668
Q34	8-729-110-53	2SA1005
Q35	8-729-110-53	2SA1005
Q36	8-729-266-83	2SC2668
Q40	8-729-117-54	2SA1175
Q41	8-729-103-19	2SA1206-K1
Q42	8-729-103-19	2SA1206-K1
Q43	8-729-266-83	2SC2668
Q44	8-729-110-53	2SA1005
Q45	8-729-110-53	2SA1005
Q46	8-729-266-83	2SC2668
Q50	8-729-117-54	2SA1175
Q51	8-729-103-19	2SA1206-K1
Q52	8-729-103-19	2SA1206-K1
Q53	8-729-266-83	2SC2668
Q54	8-729-110-53	2SA1005
Q55	8-729-110-53	2SA1005
Q56	8-729-266-83	2SC2668
Q60	8-729-117-54	2SA1175
Q62	8-729-266-83	2SC2668
Q63	8-729-103-19	2SA1206-K1
Q64	8-729-103-19	2SA1206-K1
Q65	8-729-103-19	2SA1206-K1
Q66	8-729-117-54	2SA1175

Ref.No.	Part No.	Description
R15	1-215-957-11	METAL FOIL 1.000K
R16	1-215-956-11	METAL FOIL 709.2
R17	1-215-964-11	METAL FOIL 7.241K
R18	1-215-957-11	METAL FOIL 1.000K
R19	1-215-958-11	METAL FOIL 1.590K
R20	1-215-962-11	METAL FOIL 2.636K
R21	1-215-955-11	METAL FOIL 603.0
R22	1-215-960-11	METAL FOIL 2.089K
R23	1-215-957-11	METAL FOIL 1.000K
R80	1-216-752-11	METAL FOIL 1.667K
R81	1-216-749-11	METAL FOIL 847.5
R82	1-216-754-11	METAL FOIL 4.545K
R110	1-215-957-11	METAL FOIL 1.000K
R111	1-216-751-11	METAL FOIL 1.340K
R112	1-216-753-11	METAL FOIL 3.937K
R140	1-215-957-11	METAL FOIL 1.000K
R141	1-216-750-11	METAL FOIL 1.079K
R142	1-216-755-11	METAL FOIL 13.67K

Ref.No.	Part No.	Description
RV1	1-237-528-11	METAL 1K/1K
RV3	1-237-493-11	METAL 5K
RV4	1-228-456-00	METAL 1K
RV5	1-228-456-00	METAL 1K
RV6	1-228-456-00	METAL 1K
RV7	1-228-458-00	METAL 5K
RV8	1-237-493-11	METAL 5K
RV9	1-237-493-11	METAL 5K
RV10	1-237-493-11	METAL 5K
RV11	1-228-454-00	METAL 200
RV12	1-228-454-00	METAL 200
S1	1-570-918-11	PUSH (6 KEY)

Ref.No.	Part No.	Description
EF-16 BOARD		
	A-7615-191-A	EF-16 ASSY
C2	1-161-894-00	CERAMIC 0.1 50V
C8	1-161-894-00	CERAMIC 0.1 50V
C15	1-161-894-00	CERAMIC 0.1 50V
C32	1-161-894-00	CERAMIC 0.1 50V
C43	1-161-894-00	CERAMIC 0.1 50V
C59	1-161-891-11	CERAMIC 0.033 50V
C75	1-161-888-11	CERAMIC 0.01 50V
C79	1-131-368-00	TANTALUM 3.3 10% 16V
C82	1-161-894-00	CERAMIC 0.1 50V
C84	1-161-894-00	CERAMIC 0.1 50V
C95	1-161-894-00	CERAMIC 0.1 50V
C97	1-161-894-00	CERAMIC 0.1 50V
C100	1-161-891-11	CERAMIC 0.033 50V
C102	1-161-891-11	CERAMIC 0.033 50V
C111	1-161-894-00	CERAMIC 0.1 50V
C117	1-161-888-00	CERAMIC 0.01 50V
C125	1-131-368-00	TANTALUM 3.3 10% 16V
C129	1-161-894-00	CERAMIC 0.1 50V
C135	1-161-894-00	CERAMIC 0.1 50V
C136	1-161-891-11	CERAMIC 0.033 50V
C140	1-161-894-00	CERAMIC 0.1 50V
CN1	1-563-721-11	RECEPTACLE, RF
CN2	1-563-721-11	RECEPTACLE, RF
CN3	1-563-721-11	RECEPTACLE, RF
CN4	1-563-721-11	RECEPTACLE, RF
CN5	1-563-721-11	RECEPTACLE, RF
CN6	1-563-721-11	RECEPTACLE, RF
CN7	1-563-721-11	RECEPTACLE, RF
CN8	1-563-721-11	RECEPTACLE, RF
CN9	1-563-721-11	RECEPTACLE, RF
CN10	1-563-721-11	RECEPTACLE, RF

Ref.No.	Part No.	Description
CN11	1-563-721-11	RECEPTACLE, RF
CN12	1-563-721-11	RECEPTACLE, RF
CN13	1-563-721-11	RECEPTACLE, RF
CN14	1-563-721-11	RECEPTACLE, RF
CN15	1-563-721-11	RECEPTACLE, RF
CV1	1-141-350-11	3PF
CV2	1-141-350-11	3PF
CV3	1-141-352-11	20PF
CV4	1-141-351-11	10PF
CV5	1-141-352-11	20PF
CV6	1-141-351-11	10PF
CV7	1-141-350-11	3PF
CV8	1-141-350-11	3PF
CV9	1-141-350-11	3PF
CV10	1-141-350-11	3PF
DL1	1-415-522-11	20nS
DL2	1-415-522-11	20nS
DL3	1-415-523-11	25nS
DL4	1-415-523-11	25nS
IC1	8-759-203-09	TC74HC237P: TOSHIBA
IC2	8-759-203-09	TC74HC237P: TOSHIBA
IC3	8-759-203-09	TC74HC237P: TOSHIBA
IC4	8-759-203-09	TC74HC237P: TOSHIBA
IC5	8-759-203-09	TC74HC237P: TOSHIBA
IC6	8-759-000-99	MC74HC74N: MOTOROLA
IC7	8-759-202-55	TC74HC244P: TOSHIBA
IC8	8-759-917-43	SN74HC138N: TI
IC9	8-759-917-43	SN74HC138N: TI
IC10	8-749-900-75	HDS01: SOSHIN
IC11	8-749-900-75	HDS01: SOSHIN
IC12	8-749-900-75	HDS01: SOSHIN
IC13	8-749-900-75	HDS01: SOSHIN
IC14	8-749-900-75	HDS01: SOSHIN
IC15	8-749-900-75	HDS01: SOSHIN
IC16	8-749-900-75	HDS01: SOSHIN
IC17	8-749-900-75	HDS01: SOSHIN
IC18	8-749-900-75	HDS01: SOSHIN
IC19	8-749-900-75	HDS01: SOSHIN
IC20	8-749-900-75	HDS01: SOSHIN

Ref.No.	Part No.	Description
IC21	8-749-900-75	HDS01: SOSHIN
IC22	8-749-900-75	HDS01: SOSHIN
IC23	8-749-900-75	HDS01: SOSHIN
IC24	8-749-900-75	HDS01: SOSHIN
IC25	8-749-900-75	HDS01: SOSHIN
IC26	8-749-900-75	HDS01: SOSHIN
IC27	8-749-900-75	HDS01: SOSHIN
IC28	8-749-900-75	HDS01: SOSHIN
IC29	8-749-900-75	HDS01: SOSHIN
IC30	8-749-900-75	HDS01: SOSHIN
IC31	8-749-900-75	HDS01: SOSHIN
IC32	8-749-900-75	HDS01: SOSHIN
IC33	8-749-900-75	HDS01: SOSHIN
IC34	8-749-900-75	HDS01: SOSHIN
IC35	8-749-900-75	HDS01: SOSHIN
IC36	8-749-900-75	HDS01: SOSHIN
IC37	8-749-900-75	HDS01: SOSHIN
IC38	8-749-900-75	HDS01: SOSHIN
IC39	8-749-900-75	HDS01: SOSHIN
IC40	8-749-900-75	HDS01: SOSHIN
IC41	8-749-900-75	HDS01: SOSHIN
IC42	8-749-900-75	HDS01: SOSHIN
IC43	8-749-900-75	HDS01: SOSHIN
IC44	8-749-900-75	HDS01: SOSHIN
IC45	8-759-000-99	MC74HC74N: MOTOROLA
IC46	8-749-900-75	HDS01: SOSHIN
IC47	8-749-900-75	HDS01: SOSHIN
IC48	8-749-900-75	HDS01: SOSHIN
IC49	8-749-900-75	HDS01: SOSHIN
IC50	8-759-930-80	CA3080E: RCA
IC51	8-759-930-80	CA3080E: RCA
IC52	8-749-900-75	HDS01: SOSHIN
IC53	8-749-900-75	HDS01: SOSHIN
IC54	8-749-900-75	HDS01: SOSHIN
IC55	8-749-900-75	HDS01: SOSHIN
IC56	8-759-202-74	TC74HC04P: TOSHIBA
IC57	8-759-000-99	MC74HC74N: MOTOROLA
IC58	8-759-939-87	CA3102E-S1: RCA
IC59	8-759-939-87	CA3102E-S1: RCA
IC60	8-759-930-80	CA3080E: RCA
IC61	8-759-930-80	CA3080E: RCA
IC62	8-749-900-75	HDS01: SOSHIN
IC63	8-749-900-75	HDS01: SOSHIN
IC64	8-749-900-75	HDS01: SOSHIN
IC65	8-749-900-75	HDS01: SOSHIN

Ref.No.	Part No.	Description
IC66	8-749-900-75	HDS01: SOSHIN
IC67	8-759-700-08	NJM4558S: JRC
IC68	8-759-930-80	CA3080E: RCA
IC69	8-759-930-80	CA3080E: RCA
IC70	8-749-900-75	HDS01: SOSHIN
IC71	8-759-939-87	CA3102E-S1: RCA
IC72	8-759-939-87	CA3102E-S1: RCA
IC73	8-759-930-80	CA3080E: RCA
IC74	8-759-930-80	CA3080E: RCA
J1	1-560-733-00	SHORT PIN
Q1	8-729-103-19	2SA1206-K1
Q2	8-729-266-83	2SC2668
Q3	8-729-103-19	2SA1206-K1
Q4	8-729-266-83	2SC2668
Q5	8-729-103-19	2SA1206-K1
Q6	8-729-266-83	2SC2668
Q7	8-729-103-19	2SA1206-K1
Q8	8-729-266-83	2SC2668
Q9	8-729-103-19	2SA1206-K1
Q10	8-729-266-83	2SC2668
Q11	8-729-103-19	2SA1206-K1
Q12	8-729-266-83	2SC2668
Q13	8-729-103-19	2SA1206-K1
Q14	8-729-266-83	2SC2668
Q15	8-729-266-83	2SC2668
Q16	8-729-266-83	2SC2668
Q17	8-729-266-83	2SC2668
Q18	8-729-103-19	2SA1206-K1
Q19	8-729-266-83	2SC2668
Q20	8-729-266-83	2SC2668
Q21	8-729-266-83	2SC2668
Q22	8-729-103-19	2SA1206-K1
Q23	8-729-266-83	2SC2668
Q24	8-729-266-83	2SC2668
Q25	8-729-266-83	2SC2668
Q26	8-729-266-83	2SC2668
Q27	8-729-266-83	2SC2668
Q28	8-729-266-83	2SC2668
Q29	8-729-266-83	2SC2668
Q30	8-729-266-83	2SC2668

Ref.No.	Part No.	Description
Q31	8-729-266-83	2SC2668
Q32	8-729-266-83	2SC2668
Q33	8-729-266-83	2SC2668
Q34	8-729-266-83	2SC2668
Q35	8-729-266-83	2SC2668
Q36	8-729-103-19	2SA1206-K1
Q37	8-729-800-42	2SK152
Q38	8-729-103-19	2SA1206-K1
Q39	8-729-800-42	2SK152
Q40	8-729-103-19	2SA1206-K1
Q41	8-729-266-83	2SC2668
Q42	8-729-110-53	2SA1005
Q43	8-729-266-83	2SC2668
Q44	8-729-103-19	2SA1206-K1
Q45	8-729-110-53	2SA1005
Q46	8-729-800-42	2SK152
Q47	8-729-266-83	2SC2668
Q48	8-729-800-42	2SK152
Q49	8-729-266-83	2SC2668
Q50	8-729-266-83	2SC2668
Q51	8-729-103-19	2SA1206-K1
Q52	8-729-266-83	2SC2668
Q53	8-729-103-19	2SA1206-K1
Q54	8-729-800-42	2SK152
Q55	8-729-800-42	2SK152
Q56	8-729-103-19	2SA1206-K1
Q57	8-729-266-83	2SC2668
Q58	8-729-266-83	2SC2668
Q59	8-729-266-83	2SC2668
Q60	8-729-103-19	2SA1206-K1
Q61	8-729-266-83	2SC2668
Q62	8-729-266-83	2SC2668
Q63	8-729-266-83	2SC2668
Q64	8-729-103-19	2SA1206-K1
Q65	8-729-266-83	2SC2668
Q66	8-729-110-53	2SA1005
Q67	8-729-103-19	2SA1206-K1
Q68	8-729-266-83	2SC2668
Q69	8-729-110-53	2SA1005
Q70	8-729-800-42	2SK152
Q71	8-729-266-83	2SC2668
Q72	8-729-266-83	2SC2668
Q73	8-729-800-42	2SK152
Q74	8-729-266-83	2SC2668
Q75	8-729-266-83	2SC2668

Ref.No.	Part No.	Description
Q76	8-729-266-83	2SC2668
Q77	8-729-103-19	2SA1206-K1
Q78	8-729-266-83	2SC2668
Q79	8-729-266-83	2SC2668
Q80	8-729-103-19	2SA1206-K1
Q81	8-729-103-19	2SA1206-K1
R310	1-216-034-00	METAL CHIP 240 5% 1/10W
R320	1-216-053-00	METAL CHIP 1.5K 5% 1/10W
R321	1-216-067-00	METAL CHIP 5.6K 5% 1/10W
RV1	1-228-455-00	METAL 500
RV2	1-228-455-00	METAL 500
RV3	1-228-455-00	METAL 500
RV4	1-228-455-00	METAL 500
RV5	1-228-452-00	METAL 50
RV6	1-228-452-00	METAL 50
RV7	1-228-455-00	METAL 500
RV8	1-228-455-00	METAL 500
RV9	1-228-454-00	METAL 200
RV10	1-228-454-00	METAL 200
RV11	1-228-457-00	METAL 2K
RV12	1-228-457-00	METAL 2K
RV13	1-228-454-00	METAL 200
RV14	1-228-455-00	METAL 500
RV16	1-228-459-00	METAL 10K
RV17	1-228-455-00	METAL 500
RV18	1-228-455-00	METAL 500
RV19	1-228-455-00	METAL 500
RV20	1-228-454-00	METAL 200
RV21	1-228-454-00	METAL 200
RV22	1-228-455-00	METAL 500
RV23	1-228-457-00	METAL 2K
RV24	1-228-458-00	METAL 5K
RV25	1-228-454-00	METAL 200
RV26	1-228-470-00	METAL 500
RV27	1-228-458-00	METAL 5K
RV28	1-228-471-00	METAL 1K
RV29	1-228-455-00	METAL 500

Ref.No.	Part No.	Description
KY-98 BOARD		
	A-7513-480-A	MOUNTED CIRCUIT BOARD "KY-98"
	1-518-450-31	PILOT LAMP
CN1	1-564-018-11	RECEPTACLE, 8P MALE
	1-562-153-00	PLUG, HOUSING 8P
	1-564-026-00	PLUG, CONTACT
CN2	1-564-018-11	RECEPTACLE, 8P MALE
	1-562-153-00	PLUG, HOUSING 8P
	1-564-026-00	PLUG, CONTACT
IC1	8-759-902-44	SN74LS244N: TI
IC2	8-759-202-90	TC74HC147P: TOSHIBA
IC3	8-759-203-09	TC74HC237P: TOSHIBA
IC4	8-759-203-09	TC74HC237P: TOSHIBA
IC5	8-759-954-68	SN75468N: TI
IC6	8-759-954-68	SN75468N: TI
RB1	1-231-502-00	510X4
RB2	1-231-509-00	1KX4
RB3	1-231-533-00	10KX4
RB4	1-231-533-00	10KX4
RB5	1-231-533-00	10KX4
S1	1-570-516-91	PUSH
S2	1-570-516-91	PUSH
S3	1-570-516-91	PUSH
S4	1-570-516-91	PUSH
S5	1-570-516-91	PUSH
S6	1-570-516-91	PUSH
S7	1-570-516-91	PUSH
S8	1-570-516-91	PUSH
S9	1-570-516-91	PUSH

Ref.No.	Part No.	Description
KY-99 BOARD		
	A-7615-189-A	KY-99 ASSY
	1-563-722-11	HOUSING, MICRO CONNECTOR 4P
	1-518-450-31	PILOT LAMP
C3	1-161-894-00	CERAMIC 0.1 50V
C4	1-161-894-00	CERAMIC 0.1 50V
C8	1-161-894-00	CERAMIC 0.1 50V
C9	1-161-894-00	CERAMIC 0.1 50V
C10	1-161-894-00	CERAMIC 0.1 50V
C11	1-161-894-00	CERAMIC 0.1 50V
C12	1-161-894-00	CERAMIC 0.1 50V
C13	1-161-894-00	CERAMIC 0.1 50V
C14	1-161-894-00	CERAMIC 0.1 50V
C15	1-124-147-00	ELECT 47 20% 25V
C16	1-161-894-00	CERAMIC 0.1 50V
C17	1-161-894-00	CERAMIC 0.1 50V
C18	1-161-894-00	CERAMIC 0.1 50V
C19	1-161-894-00	CERAMIC 0.1 50V
C20	1-161-894-00	CERAMIC 0.1 50V
C21	1-161-894-00	CERAMIC 0.1 50V
C22	1-161-894-00	CERAMIC 0.1 50V
C23	1-161-894-00	CERAMIC 0.1 50V
C24	1-161-894-00	CERAMIC 0.1 50V
C25	1-124-148-00	ELECT 100 20% 25V
C26	1-124-555-00	ELECT 1000 20% 16V
C27	1-161-894-00	CERAMIC 0.1 50V
C28	1-124-471-00	ELECT 1000 20% 6.3V
C29	1-161-894-00	CERAMIC 0.1 50V
C30	1-124-148-00	ELECT 100 20% 25V
C31	1-161-894-00	CERAMIC 0.1 50V
C32	1-161-894-00	CERAMIC 0.1 50V
C33	1-161-894-00	CERAMIC 0.1 50V
C34	1-161-894-00	CERAMIC 0.1 50V
C35	1-124-486-00	ELECT 1000 20% 16V
C36	1-161-894-00	CERAMIC 0.1 50V
C40	1-161-894-00	CERAMIC 0.1 50V
C41	1-161-894-00	CERAMIC 0.1 50V
C42	1-161-894-00	CERAMIC 0.1 50V
C43	1-161-894-00	CERAMIC 0.1 50V

Ref.No.	Part No.	Description
C44	1-161-894-00	CERAMIC 0.1 50V
C45	1-161-894-00	CERAMIC 0.1 50V
C46	1-124-147-00	ELECT 47 20% 25V
C49	1-161-894-00	CERAMIC 0.1 50V
C50	1-161-894-00	CERAMIC 0.1 50V
C51	1-161-894-00	CERAMIC 0.1 50V
C52	1-161-894-00	CERAMIC 0.1 50V
C55	1-161-894-00	CERAMIC 0.1 50V
C56	1-161-894-00	CERAMIC 0.1 50V
C57	1-161-894-00	CERAMIC 0.1 50V
C58	1-161-894-00	CERAMIC 0.1 50V
C60	1-161-894-00	CERAMIC 0.1 50V
C61	1-161-894-00	CERAMIC 0.1 50V
C62	1-161-894-00	CERAMIC 0.1 50V
C64	1-161-894-00	CERAMIC 0.1 50V
C70	1-124-471-00	ELECT 1000 20% 6.3V
C71	1-161-887-11	CERAMIC 0.0068 50V
C72	1-161-887-11	CERAMIC 0.0068 50V
C73	1-161-887-11	CERAMIC 0.0068 50V
C74	1-161-887-11	CERAMIC 0.0068 50V
C75	1-124-471-00	ELECT 1000 20% 6.3V
C77	1-161-896-11	CERAMIC 0.22 50V
C78	1-161-896-11	CERAMIC 0.22 50V
C79	1-161-896-11	CERAMIC 0.22 50V
C80	1-161-896-11	CERAMIC 0.22 50V
C81	1-161-896-11	CERAMIC 0.22 50V
C82	1-161-896-11	CERAMIC 0.22 50V
C83	1-161-896-11	CERAMIC 0.22 50V
C84	1-161-896-11	CERAMIC 0.22 50V
C85	1-161-888-00	CERAMIC 0.01 50V
C86	1-161-888-00	CERAMIC 0.01 50V
C87	1-161-888-00	CERAMIC 0.01 50V
C88	1-161-888-00	CERAMIC 0.01 50V
C89	1-161-888-00	CERAMIC 0.01 50V
C90	1-161-888-00	CERAMIC 0.01 50V
C91	1-161-888-00	CERAMIC 0.01 50V
C92	1-161-888-00	CERAMIC 0.01 50V
C93	1-161-894-21	CERAMIC 0.1 50V
C94	1-161-894-00	CERAMIC 0.1 50V
CN1	1-564-083-00	RECEPTACLE, 40P MALE
CN4	1-563-723-11	RECEPTACLE, 40P MALE
CN5	1-566-291-11	RECEPTACLE, 40P MALE
CN6	1-566-291-11	RECEPTACLE, 40P MALE
CN7	1-566-291-11	RECEPTACLE, 40P MALE

Ref.No.	Part No.	Description
CN8	1-561-971-00	RECEPTACLE, 20P FEMALE
CN9	1-561-971-00	RECEPTACLE, 20P FEMALE
CN10	1-566-294-11	RECEPTACLE, 20P FEMALE
CN10	1-561-971-00	RECEPTACLE, 20P FEMALE
CN11	1-566-294-00	RECEPTACLE, 20P FEMALE
CN11	1-561-971-00	RECEPTACLE, 20P FEMALE
CN12	1-561-971-00	RECEPTACLE, 20P FEMALE
CN13	1-561-971-00	RECEPTACLE, 20P FEMALE
CN14	1-560-366-00	RECEPTACLE, 4P FEMALE
CN15	1-560-360-00	RECEPTACLE, 6P FEMALE
CN16	1-563-725-11	RECEPTACLE, 60P FEMALE
CN17	1-563-724-11	RECEPTACLE, 60P FEMALE
CN18	1-563-724-11	RECEPTACLE, 60P FEMALE
CN19	1-563-724-11	RECEPTACLE, 60P FEMALE
CN20	1-563-724-11	RECEPTACLE, 60P FEMALE
CN21	1-563-724-11	RECEPTACLE, 60P FEMALE
CN25	1-563-723-11	RECEPTACLE, 1P FEMALE
CN26	1-563-723-11	RECEPTACLE, 1P FEMALE
CN27	1-563-723-11	RECEPTACLE, 1P FEMALE
CN28	1-563-723-11	RECEPTACLE, 1P FEMALE
CN29	1-563-723-11	RECEPTACLE, 1P FEMALE
CN30	1-563-723-11	RECEPTACLE, 1P FEMALE
CN31	1-563-723-11	RECEPTACLE, 1P FEMALE
CN32	1-563-723-11	RECEPTACLE, 1P FEMALE
CN33	1-563-723-11	RECEPTACLE, 1P FEMALE
CN34	1-563-723-11	RECEPTACLE, 1P FEMALE
CN35	1-563-723-11	RECEPTACLE, 1P FEMALE
CN36	1-563-723-11	RECEPTACLE, 1P FEMALE
CN37	1-563-723-11	RECEPTACLE, 1P FEMALE
CN38	1-563-723-11	RECEPTACLE, 1P FEMALE
CN39	1-563-723-11	RECEPTACLE, 1P FEMALE
CN40	1-563-723-11	RECEPTACLE, 1P FEMALE
CN41	1-563-723-11	RECEPTACLE, 1P FEMALE
CN42	1-563-723-11	RECEPTACLE, 1P FEMALE
CN43	1-563-723-11	RECEPTACLE, 1P FEMALE
CN44	1-563-723-11	RECEPTACLE, 1P FEMALE
CN45	1-563-723-11	RECEPTACLE, 1P FEMALE
CN46	1-563-723-11	RECEPTACLE, 1P FEMALE
CN47	1-563-723-11	RECEPTACLE, 1P FEMALE
CN48	1-563-723-11	RECEPTACLE, 1P FEMALE
CN49	1-563-723-11	RECEPTACLE, 1P FEMALE
CN50	1-563-723-11	RECEPTACLE, 1P FEMALE
CN51	1-563-723-11	RECEPTACLE, 1P FEMALE
CN52	1-563-723-11	RECEPTACLE, 1P FEMALE
CN53	1-563-723-11	RECEPTACLE, 1P FEMALE
CN54	1-563-723-11	RECEPTACLE, 1P FEMALE
CN55	1-563-723-11	RECEPTACLE, 1P FEMALE
CNI25	1-526-656-00	IC SOCKET 20P
CNI26	1-526-656-00	IC SOCKET 20P
CNI27	1-526-656-00	IC SOCKET 20P

Ref.No.	Part No.	Description
D1	8-719-920-31	ERA15-01
D2	8-719-920-31	ERA15-01
D3	8-719-920-31	ERA15-01
D4	8-719-920-31	ERA15-01
D5	8-719-920-31	ERA15-01
D6	8-719-920-31	ERA15-01
D7	8-719-920-31	ERA15-01
D8	8-719-920-31	ERA15-01
D9	8-719-920-31	ERA15-01
D10	8-719-920-31	ERA15-01
D11	8-719-920-31	ERA15-01
D12	8-719-920-31	ERA15-01
D13	8-719-920-31	ERA15-01
D14	8-719-920-31	ERA15-01
D15	8-719-920-31	ERA15-01
D16	8-719-920-31	ERA15-01
D17	8-719-920-31	ERA15-01
D18	8-719-920-31	ERA15-01
D19	8-719-920-31	ERA15-01
D20	8-719-920-31	ERA15-01
D21	8-719-920-31	ERA15-01
D22	8-719-920-31	ERA15-01
D23	8-719-920-31	ERA15-01
D24	8-719-920-31	ERA15-01
D25	8-719-920-31	ERA15-01
D26	8-719-920-31	ERA15-01
D27	8-719-920-31	ERA15-01
D28	8-719-920-31	ERA15-01
D29	8-719-815-55	1S1555
D30	8-719-815-55	1S1555

Ref.No.	Part No.	Description
D31	8-719-815-55	1S1555
D32	8-719-815-55	1S1555
D33	8-719-815-55	1S1555
D34	8-719-815-55	1S1555
D35	8-719-815-55	1S1555
D36	8-719-815-55	1S1555
D37	8-719-815-55	1S1555
D38	8-719-815-55	1S1555
D39	8-719-815-55	1S1555
D40	8-719-815-55	1S1555
D41	8-719-815-12	1S1555
D42	8-719-921-55	SLP155B
D43	8-719-900-92	GL-9PR20
D44	8-719-900-92	GL-9PR20
D45	8-719-900-92	GL-9PR20
D46	8-719-900-92	GL-9PR20
D47	8-719-941-29	5082-7300
D48	8-719-941-29	5082-7300
D49	8-719-941-29	5082-7300

Ref.NO.	Part No.	Description
IC1	8-759-200-08	TC40H367P: TOSHIBA
IC2	8-759-100-88	uPD8279C-5: NEC
IC3	8-759-906-41	SN74LS641N: TI
IC4	8-759-901-45	SN74LS145N: TI
IC5	8-759-954-68	SN75468N: TI
IC6	8-759-901-38	SN74LS138N: TI
IC7	8-759-954-68	SN75468N: TI
IC8	8-759-900-04	SN74LS04N: TI
IC9	8-759-206-41	TD62083AP: TOSHIBA
IC11	8-759-100-88	uPD8279C-5: NEC
IC12	8-759-901-45	SN74LS145N: TI
IC13	8-759-901-38	SN74LS138: TI
IC14	8-759-906-41	SN74LS641N: TI
IC15	8-759-904-76	AM26LS31CN: ADVANCED MICRO DEVICES
IC16	8-759-904-76	AM26LS31CN: ADVANCED MICRO DEVICES
IC17	8-759-200-08	TC40H367P: TOSHIBA
IC18	8-759-200-43	TC40H244P: TOSHIBA
IC19	8-759-200-43	TC40H244P: TOSHIBA
IC20	8-759-200-43	TC40H244P: TOSHIBA
IC21	8-759-100-88	uPD8279C-5: NEC
IC22	8-741-141-20	BX-1412: SONY
IC23	8-741-141-20	BX-1412: SONY
IC24	8-741-141-20	BX-1412: SONY
IC25	8-759-200-43	TC40H244P: TOSHIBA
IC26	8-759-200-44	TC40H245P: TOSHIBA
IC27	8-759-200-43	TC40H244P: TOSHIBA
IC28	8-759-200-46	TC40H273P: TOSHIBA
IC29	8-759-200-46	TC40H273P: TOSHIBA
IC30	8-759-200-22	TC40H138P: TOSHIBA
IC31	8-759-954-68	SN75468N: TI
IC32	8-759-954-68	SN75468N: TI
IC33	8-759-954-68	SN75468N: TI
IC34	8-759-200-22	TC40H138P: TOSHIBA
IC35	8-759-990-82	TL082CP: TI
IC36	8-759-200-22	TC40H138P: TOSHIBA
IC37	8-759-220-04	TC40H004P: TOSHIBA
IC39	8-759-220-00	TC40H000P: TOSHIBA
IC41	8-759-901-45	SN74LS145N: TI
IC42	8-759-901-39	SN74LS139N: TI
IC43	8-759-906-41	SN74LS641N: TI
IC44	8-759-200-46	TC40H273P: TOSHIBA
IC45	8-759-200-50	TC40H374P: TOSHIBA
IC47	8-759-200-22	TC40H138P: TOSHIBA
IC48	8-759-200-22	TC40H138P: TOSHIBA
IC49	8-759-200-22	TC40H138P: TOSHIBA
IC51	8-759-220-04	TC40H004P: TOSHIBA
IC52	8-759-200-17	TC40H027P: TOSHIBA
IC53	8-759-200-43	TC40H244P: TOSHIBA
IC54	8-759-200-43	TC40H244P: TOSHIBA
IC55	8-759-240-49	TC4049BP: TOSHIBA

Ref.No.	Part No.	Description
IC56	8-759-200-08	TC40H367P: TOSHIBA
IC57	8-759-240-49	TC4049BP: TOSHIBA
IC58	8-759-200-08	TC40H367P: TOSHIBA
IC59	8-759-220-32	TC40H032P: TOSHIBA
IC60	8-759-240-49	TC4049BP: TOSHIBA
IC61	8-759-240-49	TC4049BP: TOSHIBA
IC62	8-759-240-49	TC4049BP: TOSHIBA
IC63	8-759-990-82	TL082CP: TI
IC64	8-759-990-84	TL084CN: TI
IC65	8-759-990-84	TL084CN: TI
IC66	8-759-990-84	TL084CN: TI
IC67	8-759-990-84	TL084CN: TI
IC68	8-759-106-58	uPD7004C: NEC
IC69	8-759-106-58	uPD7004C: NEC
IC70	8-759-223-68	TC40H368P: TOSHIBA
IC71	8-759-200-43	TC40H244P: TOSHIBA
IC72	8-759-926-32	AM26LS32PC: ADVANCE MICRO DEVICES
IC73	8-759-904-76	AM26LS31CN: ADVANCE MICRO DEVICES
IC74	8-759-904-76	AM26LS31CN: ADVANCE MICRO DEVICES
IC75	8-759-904-76	AM26LS31CN: ADVANCE MICRO DEVICES
IC76	8-759-220-74	TC40H074P: TOSHIBA
IC77	8-759-954-68	SN75468N: TI
IC78	8-759-200-46	TC40H273P: TI
IC79	8-759-954-68	SN75468N: TI
IC81	8-759-902-44	SN74LS244N: TI
IC82	8-759-221-75	TC40H175P: TOSHIBA
IC83	8-759-200-08	TC40H367P: TOSHIBA
IC85	8-759-939-38	DAP801: ROHM
IC86	8-759-939-39	DAN801: ROHM
IC87	8-759-939-38	DAP801: ROHM
IC88	8-759-939-39	DAN801: ROHM
IC89	8-759-003-17	LM317T: NSC
IC90	8-759-903-37	LM337T: NSC
IC91	8-759-913-44	TL317P: TI
L1	1-421-329-00	CHOKE 10
Q3	8-729-195-23	2SA952
Q4	8-729-195-23	2SA952
Q5	8-729-195-23	2SA952
Q6	8-729-195-23	2SA952
Q7	8-729-195-23	2SA952
Q8	8-729-195-23	2SA952
Q9	8-729-195-23	2SA952
Q10	8-729-195-23	2SA952
Q11	8-729-195-23	2SA952
Q12	8-729-195-23	2SA952

Ref.No.	Part No.	Description
Q18	8-729-195-23	2SA952
Q20	8-729-195-23	2SA952
R23	1-247-704-11	CARBON 220 5% 1/4W
R37	1-247-704-11	CARBON 220 5% 1/4W
R45	1-247-704-11	CARBON 220 5% 1/4W
R61	1-247-704-11	CARBON 220 5% 1/4W
R63	1-247-704-11	CARBON 220 5% 1/4W
R64	1-247-704-11	CARBON 220 5% 1/4W
R78	1-247-704-11	CARBON 220 5% 1/4W
RB1	1-231-408-00	5100
RB2	1-231-385-00	4700
RB3	1-231-408-00	5100
RB4	1-231-385-00	4700
RB5	1-231-408-00	5100
RB6	1-231-410-00	10K
RB7	1-231-410-00	10K
RB8	1-231-410-00	10K
RB9	1-231-410-00	10K
RB10	1-231-509-00	CIRCUIT BLOCK
RB11	1-231-410-00	10K
RB12	1-231-410-00	10K
RB13	1-231-410-00	10K
RB14	1-231-410-00	10K
RB15	1-231-516-00	2KX4
RB16	1-231-509-00	1KX4
RB17	1-231-408-00	5100
RB18	1-231-408-00	5100
RB19	1-231-410-00	10K
RB20	1-231-410-00	10K
RV1	1-228-452-00	METAL 50
RV2	1-228-452-00	METAL 50
RV3	1-237-494-11	METAL 5K
RV4	1-237-494-11	METAL 5K
RV5	1-228-456-00	METAL 1K
RV6	1-237-494-11	METAL 5K
RV7	1-237-494-11	METAL 5K
RV8	1-237-494-11	METAL 5K
RV9	1-237-494-11	METAL 5K
RV10	1-237-494-11	METAL 5K
RV11	1-237-494-11	METAL 5K
RV12	1-228-453-00	METAL 100
RV14	1-228-455-11	METAL 500
RV16	1-230-995-11	METAL 5K
RV17	1-228-457-00	METAL 2K
RV18	1-228-457-00	METAL 2K
RY1	1-515-644-11	167Ω5V
RY2	1-515-644-11	167Ω5V
RY3	1-515-644-11	167Ω5V
RY4	1-515-644-11	167Ω5V
RY5	1-515-644-11	167Ω5V

Ref.No.	Part No.	Description
RY6	1-515-644-11	167 5V
RY7	1-515-644-11	167 5V
RY8	1-515-644-11	167 5V
RY9	1-515-644-11	167 5V
S1	1-554-048-00	PUSH SWITCH
S1	1-570-919-11	PUSH BUTTON SWITCH
S2	1-554-048-00	PUSH SWITCH
S2	1-570-919-11	PUSH BUTTON SWITCH
S3	1-554-041-11	PUSH SWITCH
S3	1-570-919-11	PUSH BUTTON SWITCH
S4	1-554-041-11	PUSH SWITCH
S4	1-570-919-11	PUSH BUTTON SWITCH
S5	1-570-516-91	PUSH SWITCH
S5	1-570-919-11	PUSH BUTTON SWITCH
S6	1-570-516-91	PUSH SWITCH
S6	1-570-919-11	PUSH BUTTON SWITCH
S7	1-570-516-91	PUSH SWITCH
S7	1-570-919-11	PUSH BUTTON SWITCH
S8	1-570-516-91	PUSH SWITCH
S8	1-570-919-11	PUSH BUTTON SWITCH
S9	1-570-516-91	PUSH SWITCH
S9	1-570-919-11	PUSH BUTTON SWITCH
S10	1-570-516-91	PUSH SWITCH
S10	1-570-919-11	PUSH BUTTON SWITCH
S11	1-570-516-91	PUSH SWITCH
S11	1-570-919-11	PUSH BUTTON SWITCH
S12	1-570-516-91	PUSH SWITCH
S12	1-570-919-11	PUSH BUTTON SWITCH
S13	1-570-516-91	PUSH SWITCH
S13	1-570-919-11	PUSH BUTTON SWITCH
S14	1-570-516-91	PUSH SWITCH
S14	1-570-919-11	PUSH BUTTON SWITCH
S15	1-570-516-91	PUSH SWITCH
S15	1-570-919-11	PUSH BUTTON SWITCH
S16	1-570-516-91	PUSH SWITCH
S16	1-570-919-11	PUSH BUTTON SWITCH
S17	1-570-516-91	PUSH SWITCH
S17	1-570-919-11	PUSH BUTTON SWITCH
S18	1-570-516-91	PUSH SWITCH
S18	1-570-919-11	PUSH BUTTON SWITCH
S19	1-570-516-91	PUSH SWITCH
S19	1-570-919-11	PUSH BUTTON SWITCH
S20	1-570-516-91	PUSH SWITCH
S20	1-570-919-11	PUSH BUTTON SWITCH

Ref.No.	Part No.	Description
S41	1-554-041-11	PUSH
S42	1-554-041-11	PUSH
S43	1-554-041-11	PUSH
S44	1-554-041-11	PUSH
S45	1-570-516-91	PUSH
S46	1-570-516-91	PUSH
S47	1-554-048-00	PUSH
S48	1-570-516-91	PUSH
S49	1-570-516-91	PUSH
S50	1-554-045-41	PUSH
S51	1-554-048-00	PUSH
S52	1-554-041-11	PUSH
S53	1-570-207-41	PUSH
S54	1-570-207-41	PUSH
S55	1-554-041-11	PUSH
S56	1-554-041-11	PUSH
S57	1-554-041-11	PUSH
S58	1-554-041-11	PUSH
S59	1-554-041-11	PUSH
S60	1-554-041-11	PUSH
S61	1-570-516-91	PUSH
S62	1-570-516-91	PUSH
S63	1-554-048-00	PUSH
S64	1-570-045-51	PUSH
S65	1-554-045-31	PUSH
S66	1-554-048-00	PUSH
VDR1	1-806-504-11	DK820
VDR2	1-806-504-11	DK820
VDR3	1-806-504-11	DK820
VDR4	1-806-504-11	DK820
VDR5	1-806-504-11	DK820

Ref.No.	Part No.	Description
RE-26 BOARD		
	A-7513-475-A	MOUNTED CIRCUIT BOARD "RE-26"
C2	1-131-348-00	TANTALUM 1.5 10% 35V
C6	1-161-894-21	CERAMIC 0.1 50V
C7	1-126-086-61	ELECT 6800 20% 16V
C8	1-124-555-00	ELECT 1000 20% 16V
C9	1-126-086-61	ELECT 6800 20% 16V
CN1	1-508-765-11	PLUG, 3P MALE
CN2	1-508-765-11	PLUG, 3P MALE
CN3	1-508-765-11	PLUG, 3P MALE
CN4	1-560-008-11	POST HEADER, EI CONECTOR 3P
CN5	1-508-901-11	CONNECTOR, 3P MALE
⚠CN6	1-537-045-11	TERMINAL BOARD 3P
CN7	1-508-766-11	PLUG, 4P MALE
CN8	1-508-765-11	PLUG, 3P MALE
⚠CN9	1-537-045-11	TERMINAL BOARD 3P
⚠CN10	1-537-046-11	TERMINAL BOARD 5P
D1	8-719-200-02	10E-2
D2	8-719-200-02	10E-2
IC1	8-759-145-58	uPC4558C: NEC
IC2	8-759-905-80	AD580M: ANALOG DEVICES
R6	1-207-909-00	WIREWOUND 3.9 10% 3W
RV1	1-230-746-11	METAL 500
RV2	1-230-744-11	METAL 100
T1	1-464-741-11	DC-DC CONVERTER

Ref.No.	Part No.	Description
SG-139 BOARD		
	A-7513-641-A	MOUNTED CIRCUIT BOARD "SG-139"
	1-561-832-00	SHORT SOCKET
C1	1-161-485-00	CERAMIC 0.1 50V
C5	1-161-485-00	CERAMIC 0.1 50V
C6	1-107-202-00	MICA 10PF 5% 500V
C8	1-102-106-21	CERAMIC 100PF 10% 50V
C10	1-161-485-00	CERAMIC 0.1 50V
C11	1-161-485-00	CERAMIC 0.1 50V
C13	1-130-483-11	MYLAR 0.01 5% 50V
C14	1-130-483-11	MYLAR 0.01 20% 16V
C15	1-161-485-00	CERAMIC 0.1 50V
C16	1-161-001-11	CERAMIC 0.001 10% 25V
C17	1-161-485-00	CERAMIC 0.1 50V
C18	1-161-485-00	CERAMIC 0.1 50V
C19	1-161-485-00	CERAMIC 0.1 50V
C20	1-161-485-00	CERAMIC 0.1 50V
C21	1-161-485-00	CERAMIC 0.1 50V
C22	1-161-485-00	CERAMIC 0.1 50V
C23	1-161-485-00	CERAMIC 0.1 50V
C24	1-161-485-00	CERAMIC 0.1 50V
C26	1-130-483-11	MYLAR 0.01 50V
C27	1-161-485-00	CERAMIC 0.1 50V
C28	1-102-115-21	CERAMIC 560PF 10% 50V
C29	1-161-001-11	CERAMIC 0.001 10% 25V
C30	1-161-485-00	CERAMIC 0.1 50V
C31	1-161-485-00	CERAMIC 0.1 50V
C33	1-161-485-00	CERAMIC 0.1 50V
C34	1-161-485-00	CERAMIC 0.1 50V
C36	1-161-485-00	CERAMIC 0.1 50V
C37	1-161-485-00	CERAMIC 0.1 50V
C38	1-161-485-00	CERAMIC 0.1 50V
C39	1-161-485-00	CERAMIC 0.1 50V
C40	1-161-485-00	CERAMIC 0.1 50V
C42	1-161-485-00	CERAMIC 0.1 50V
C43	1-161-485-00	CERAMIC 0.1 50V
C45	1-161-485-00	CERAMIC 0.1 50V
C46	1-161-485-00	CERAMIC 0.1 50V
C48	1-161-485-00	CERAMIC 0.1 50V
C49	1-124-584-11	ELECT 100 20% 10V
C50	1-124-584-11	ELECT 100 20% 10V
C51	1-124-584-11	ELECT 100 20% 10V
C52	1-124-584-11	ELECT 100 20% 10V
C53	1-107-159-11	MICA 33PF 5% 500V
C54	1-107-206-11	MICA 15PF 5% 500V
C55	1-102-108-21	CERAMIC 150PF 10% 50V
C56	1-161-485-00	CERAMIC 0.1MF 10% 50V
C58	1-161-485-00	CERAMIC 0.1MF 50V
C59	1-161-485-00	CERAMIC 0.1MF 50V
C60	1-161-485-00	CERAMIC 0.1MF 50V
C61	1-102-110-21	CERAMIC 220PF 10% 50V
C62	1-161-485-00	CERAMIC 0.1MF 50V
C64	1-161-485-00	CERAMIC 0.1MF 50V
C65	1-161-485-00	CERAMIC 0.1MF 50V
C66	1-161-485-00	CERAMIC 0.1MF 50V
C67	1-161-485-00	CERAMIC 0.1MF 50V
C68	1-161-485-00	CERAMIC 0.1MF 50V
C69	1-161-485-00	CERAMIC 0.1MF 50V
C72	1-107-040-00	MICA 1.5PF 0.5PF 500V
C75	1-161-485-00	CERAMIC 0.1MF 50V
C76	1-107-040-00	MICA 1.5PF 0.5PF 500V
C78	1-161-485-00	CERAMIC 0.1MF 50V
C79	1-107-040-00	MICA 1.5PF 0.5PF 500V
C81	1-161-485-00	CERAMIC 0.1MF 50V
C82	1-161-485-00	CERAMIC 0.1MF 50V
C83	1-161-485-00	CERAMIC 0.1MF 50V
C84	1-161-485-00	CERAMIC 0.1MF 50V
C85	1-161-485-00	CERAMIC 0.1MF 50V
C86	1-161-485-00	CERAMIC 0.1MF 50V
C87	1-161-485-00	CERAMIC 0.1MF 50V
C88	1-107-159-11	MICA 33PF 5% 500V
CN1	1-560-310-00	RECEPTACLE
CN2	1-560-310-00	RECEPTACLE
CN3	1-560-310-00	RECEPTACLE
CN4	1-560-310-00	RECEPTACLE
CN5	1-560-310-00	RECEPTACLE
CN6	1-560-310-00	RECEPTACLE
CN7	1-560-310-00	RECEPTACLE
CNI18	1-526-656-00	SOCKET IC 20P
FB1	1-535-178-00	FERRITE BEADRING
FB2	1-535-178-00	FERRITE BEADRING
FB3	1-535-178-00	FERRITE BEADRING
IC1	8-759-901-23	SN74LS123N: TI
IC2	8-759-202-22	TC74HC74P: TOSHIBA
IC3	8-759-202-11	TC74HC00P: TOSHIBA
IC4	8-759-202-32	TC74HC163P: TOSHIBA
IC5	8-759-202-32	TC74HC163P: TOSHIBA
IC6	8-759-202-32	TC74HC163P: TOSHIBA
IC8	8-759-203-36	TC74HC374P: TOSHIBA
IC9	8-759-203-36	TC74HC374P: TOSHIBA
IC10	8-759-202-22	TC74HC74P: TOSHIBA
IC11	8-759-902-21	SN74LS221N: TI

Ref.No.	Part No.	Description
IC12	8-759-918-71	CX23065: SONY
IC13	8-759-906-01	TL601CP: TI
IC14	8-759-946-64	SN74ALS04BN: TI
IC15	8-759-946-36	SN74ALS163BN: TI
IC16	8-759-202-32	TC74HC163P: TOSHIBA
IC17	8-759-202-32	TC74HC163P: TOSHIBA
IC18	8-759-785-04	MB7124E-HT100012
IC19	8-759-202-74	TC74HC04P: TOSHIBA
IC20	8-759-708-05	NJM78L05A: JRC
IC21	8-759-203-36	TC74HC374P: TOSHIBA
IC22	8-759-202-14	TC74HC08P: TOSHIBA
IC23	8-759-202-14	TC74HC08P: TOSHIBA
IC24	8-759-900-19	SN74128N: TI
IC25	8-759-202-12	TC74HC02P: TOSHIBA
IC26	8-759-202-27	TC74HC157P: TOSHIBA
IC27	8-759-202-12	TC74HC02P: TOSHIBA
IC28	8-759-202-32	TC74HC163P: TOSHIBA
IC29	8-759-202-32	TC74HC163P: TOSHIBA
Q1	8-729-178-54	2SC2785-F
Q2	8-729-266-83	2SC2668-Y
Q3	8-729-117-54	2SA1175-F
Q4	8-729-103-19	2SA1206-K1
Q5	8-729-178-54	2SC2785-F
Q6	8-729-178-54	2SC2785-F
Q7	8-729-117-54	2SA1175-F
Q8	8-729-117-54	2SA1175-F
Q9	8-729-266-83	2SC2668-Y
Q10	8-729-117-54	2SA1175-F
Q11	8-729-178-54	2SC2785-F
Q12	8-729-178-54	2SC2785-F
Q13	8-729-178-54	2SC2785-F
Q14	8-729-117-54	2SA1175-F
Q15	8-729-266-83	2SC2668-Y
Q16	8-729-266-83	2SC2668-Y
Q17	8-729-266-83	2SC2668-Y
Q18	8-729-117-54	2SA1175-F
Q19	8-729-266-83	2SC2668-Y
Q20	8-729-266-83	2SC2668-Y
Q21	8-729-266-83	2SC2668-Y
Q22	8-729-117-54	2SA1175-F
Q23	8-729-266-83	2SC2668-Y
Q24	8-729-266-83	2SC2668-Y
Q25	8-729-266-83	2SC2668-Y

Ref.No.	Part No.	Description
Q26	8-729-178-54	2SC2785-F
Q27	8-729-178-54	2SC2785-F
Q28	8-729-178-54	2SC2785-F
R46	1-217-587-11	SHORT 0.01MP 1%
R100	1-218-246-11	METAL FOIL 2358.5
R101	1-216-763-11	METAL FOIL 713.4
R102	1-218-248-11	METAL FOIL 5747
R104	1-215-957-11	METAL FOIL 1.000K
R105	1-218-244-11	METAL FOIL 1116
R106	1-218-249-11	METAL FOIL 9057.5
R108	1-218-247-11	METAL FOIL 4307
R109	1-218-245-11	METAL FOIL 1302
R110	1-215-957-11	METAL FOIL 1.000K
RB1	1-231-410-11	RESISTER BLOCK
RV1	1-228-471-11	METAL 1K
RV2	1-228-456-11	METAL 1K
RV3	1-228-456-11	METAL 1K
RV4	1-228-457-11	METAL 2K
RV5	1-228-454-11	METAL 200
RV6	1-228-454-11	METAL 200
RV7	1-228-452-11	METAL 50
RV8	1-228-454-11	METAL 200
RV9	1-228-452-11	METAL 50
RV10	1-228-452-11	METAL 50
S1	1-570-373-12	SLIDE
SH1	1-560-733-00	SHORT PIN
SH2	1-560-733-00	SHORT PIN
SH3	1-560-733-00	SHORT PIN
SH4	1-560-733-00	SHORT PIN
SH5	1-560-733-00	SHORT PIN
SH6	1-560-733-00	SHORT PIN
X1	1-567-782-11	CRYSTAL

Ref.No.	Part No.	Description
SG-115 BOARD		
	A-7513-471-A	MOUNTED CIRCUIT BOARD "SG-115"
C3	1-161-485-00	CERAMIC 0.1 50V
C4	1-161-485-00	CERAMIC 0.1 50V
C5	1-102-106-00	CERAMIC 100PF 10% 50V
C6	1-130-483-00	FILM 0.01 5% 50V
C7	1-161-039-00	CERAMIC 0.001 10% 25V
C8	1-130-483-00	FILM 0.01 5% 50V
C9	1-131-347-00	TANTALUM 1 10% 35V
C11	1-161-485-00	CERAMIC 0.1 50V
C12	1-161-039-00	CERAMIC 0.001 10% 25V
C13	1-161-485-00	CERAMIC 0.1 50V
C14	1-161-485-00	CERAMIC 0.1 50V
C15	1-161-485-00	CERAMIC 0.1 50V
C16	1-124-584-00	ELECT 100 20% 10V
C17	1-107-040-00	MICA 1.5PF ±0.5PF 500V
C18	1-107-040-00	MICA 1.5PF ±0.5PF 500V
C19	1-107-040-00	MICA 1.5PF ±0.5PF 500V
C23	1-161-485-00	CERAMIC 0.1 50V
C25	1-161-485-00	CERAMIC 0.1 50V
C27	1-161-485-00	CERAMIC 0.1 50V
C29	1-161-485-00	CERAMIC 0.1 50V
C30	1-161-485-00	CERAMIC 0.1 50V
C31	1-161-485-00	CERAMIC 0.1 50V
C32	1-161-485-00	CERAMIC 0.1 50V
C33	1-161-485-00	CERAMIC 0.1 50V
C38	1-161-485-00	CERAMIC 0.1 50V
C39	1-161-485-00	CERAMIC 0.1 50V
C40	1-161-485-00	CERAMIC 0.1 50V
C41	1-161-485-00	CERAMIC 0.1 50V
C43	1-161-485-00	CERAMIC 0.1 50V
C44	1-161-485-00	CERAMIC 0.1 50V
C45	1-102-110-00	CERAMIC 220PF 10% 50V
C48	1-161-485-00	CERAMIC 0.1 50V
C49	1-161-485-00	CERAMIC 0.1 50V
C50	1-161-485-00	CERAMIC 0.1 50V
C51	1-161-485-00	CERAMIC 0.1 50V
C52	1-161-485-00	CERAMIC 0.1 50V
C53	1-161-485-00	CERAMIC 0.1 50V
C54	1-161-485-00	CERAMIC 0.1 50V
C55	1-161-485-00	CERAMIC 0.1 50V
C56	1-161-485-00	CERAMIC 0.1 50V
C57	1-161-485-00	CERAMIC 0.1 50V
C58	1-161-485-00	CERAMIC 0.1 50V
C59	1-161-485-00	CERAMIC 0.1 50V
C60	1-161-485-00	CERAMIC 0.1 50V
C61	1-161-485-00	CERAMIC 0.1 50V
C62	1-161-485-00	CERAMIC 0.1 50V
C63	1-161-485-00	CERAMIC 0.1 50V
C64	1-161-485-00	CERAMIC 0.1 50V
C65	1-161-485-00	CERAMIC 0.1 50V
C66	1-161-485-00	CERAMIC 0.1 50V
C76	1-161-485-00	CERAMIC 0.1 50V
C77	1-161-485-00	CERAMIC 0.1 50V
C82	1-102-110-00	CERAMIC 220PF 10% 50V
C83	1-124-143-00	ELECT 100 20% 16V
C86	1-102-106-00	CERAMIC 100PF 10% 50V
CN2	1-561-310-00	RECEPTACLE, RF
CN3	1-561-310-00	RECEPTACLE, RF
CN4	1-561-310-00	RECEPTACLE, RF
CN5	1-561-310-00	RECEPTACLE, RF
CN6	1-561-310-00	RECEPTACLE, RF
CN7	1-561-310-00	RECEPTACLE, RF
CN8	1-561-310-00	RECEPTACLE, RF
CNI22	1-526-656-00	IC SOCKET 20P
FB1	1-535-178-00	FERRITE BEADRING
FB2	1-535-178-00	FERRITE BEADRING
FB3	1-535-178-00	FERRITE BEADRING
IC1	8-759-901-23	SN74LS123N: TI
IC2	8-759-000-XX	MC74HC74P: MOTOROLA
IC3	8-759-902-21	SN74LS221N: TI
IC4	8-759-918-71	CX23065: SONY
IC5	8-759-708-05	NJM78L05A: JRC
IC6	8-759-906-01	TL601CP: TI
IC7	8-759-946-64	SN74ALS04BN
IC8	8-759-946-36	SN74ALS163BN
IC9	8-759-202-11	TC74HC00P: TOSHIBA
IC10	8-759-202-32	TC74HC163P: TOSHIBA

Ref.No.	Part No.	Description
IC11	8-759-202-32	TC74HC163P: TOSHIBA
IC12	8-759-202-32	TC74HC163P: TOSHIBA
IC15	8-759-778-35	27C32A-SGV100011 (S)
	8-759-778-36	27C32A-SGVN00011 (N)
IC16	8-759-203-36	TC74HC374P: TOSHIBA
IC17	8-759-203-36	TC74HC374P: TOSHIBA
IC18	8-759-900-19	SN74128N: TI
IC19	8-759-202-12	TC74HC02P: TOSHIBA
IC20	8-759-202-32	TC74HC163P: TOSHIBA
IC21	8-759-202-32	TC74HC163P: TOSHIBA
IC22	8-759-778-37	TBP28L42N-SGH100011 (S)
	8-759-778-38	TBP28L42N-SGHN00011 (N)
IC23	8-759-000-XX	TC74HC74P: MOTOROLA
IC24	8-759-202-14	TC74HC08P: TOSHIBA
IC25	8-759-203-36	TC74HC374P: TOSHIBA
IC26	8-759-903-74	SN74LS374N: TI
IC27	8-759-906-76	74F283PC: FSC
IC28	8-759-913-63	SN74ALS374N: TI
IC29	8-759-778-41	MB7112H-SGS100011 (S)
	8-759-778-42	MB7112H-SGSN00011 (N)
IC30	8-759-903-74	SN74LS374N: TI
IC31	8-759-202-12	TC74HC02P: TOSHIBA
IC32	8-759-202-32	TC74HC163P: TOSHIBA
IC33	8-759-202-32	TC74HC163P: TOSHIBA
IC34	8-759-202-74	TC74HC04P: TOSHIBA

Ref.No.	Part No.	Description
Q1	8-729-178-54	2SC2785
Q2	8-729-117-54	2SA1175
Q3	8-729-103-19	2SA1206-K1
Q4	8-729-178-54	2SC2785
Q5	8-729-178-54	2SC2785
Q6	8-729-117-54	2SA1175
Q7	8-729-117-54	2SA1175
Q8	8-729-117-54	2SA1175
Q9	8-729-178-54	2SC2785
Q10	8-729-178-54	2SC2785
Q11	8-729-178-54	2SC2785
Q12	8-729-178-54	2SC2785
Q13	8-729-266-83	2SC2668
Q14	8-729-178-54	2SC2785
Q15	8-729-178-54	2SC2785
Q16	8-729-178-54	2SC2785
Q17	8-729-178-54	2SC2785
Q18	8-729-117-54	2SA1175
Q19	8-729-117-54	2SA1175
Q20	8-729-266-83	2SC2668

Ref.No.	Part No.	Description
Q21	8-729-266-83	2SC2668
Q22	8-729-266-83	2SC2668
Q23	8-729-266-83	2SC2668
Q24	8-729-266-83	2SC2668
Q25	8-729-266-83	2SC2668
Q26	8-729-266-83	2SC2668
Q27	8-729-266-83	2SC2668
Q28	8-729-266-83	2SC2668
Q29	8-729-266-83	2SC2668
R85	1-216-752-11	METAL FOIL 1.667K
R86	1-216-749-11	METAL FOIL 847.5
R87	1-216-754-11	METAL FOIL 4.545K
R92	1-215-957-11	METAL FOIL 1.000K
R93	1-216-751-11	METAL FOIL 1.340K
R94	1-216-753-11	METAL FOIL 3.937K
R99	1-216-755-11	METAL FOIL 13.67K
R100	1-216-750-11	METAL FOIL 1.079K
R101	1-215-957-11	METAL FOIL 1.000K
RB1	1-235-948-11	750 /1.5K
RB2	1-235-948-11	750 /1.5K
RB3	1-231-533-00	10Kx4
RV1	1-228-470-00	METAL 500
RV2	1-228-454-00	METAL 200
RV3	1-228-454-00	METAL 200
RV4	1-228-454-00	METAL 200
RV5	1-228-455-00	METAL 500
RV6	1-228-456-00	METAL 1K
RV7	1-228-452-00	METAL 50
RV8	1-228-452-00	METAL 50
RV9	1-228-452-00	METAL 50
RV10	1-228-452-00	METAL 50
X1	1-567-782-11	24.57MHz (S)
	1-567-783-11	25.894MHz (N)

Ref.No.	Part No.	Description
SW-136 BOARD		
	A-7513-479-A	MOUNTED CIRCUIT BOARD "SW-136"
CN10	1-566-294-11	RECEPTACLE, 20P MALE
CN11	1-566-294-11	RECEPTACLE, 20P MALE
S1	1-570-919-11	PUSH
S2	1-570-919-11	PUSH
S3	1-570-919-11	PUSH
S4	1-570-919-11	PUSH
S5	1-570-919-11	PUSH
S6	1-570-919-11	PUSH
S7	1-570-919-11	PUSH
S8	1-570-919-11	PUSH
S9	1-570-919-11	PUSH
S10	1-570-919-11	PUSH
S11	1-570-919-11	PUSH
S12	1-570-919-11	PUSH
S13	1-570-919-11	PUSH
S14	1-570-919-11	PUSH
S15	1-570-919-11	PUSH
S16	1-570-919-11	PUSH
S17	1-570-919-11	PUSH
S18	1-570-919-11	PUSH
S19	1-570-919-11	PUSH
S20	1-570-919-11	PUSH

Ref.No.	Part No.	Description
SY-63 BOARD		
	A-7513-468-A	MOUNTED CIRCUIT BOARD "SY-63"
C1	1-124-147-00	ELECT 47MF 20% 25V
C2	1-124-147-00	ELECT 47MF 20% 25V
C4	1-161-894-00	CERAMIC 0.1 50V
C5	1-161-894-00	CERAMIC 0.1 50V
C6	1-161-894-00	CERAMIC 0.1 50V
C7	1-161-894-00	CERAMIC 0.1 50V
C8	1-161-894-00	CERAMIC 0.1 50V
C9	1-161-894-00	CERAMIC 0.1 50V
C10	1-161-894-00	CERAMIC 0.1 50V
C11	1-161-894-00	CERAMIC 0.1 50V
C12	1-161-894-00	CERAMIC 0.1 50V
C13	1-161-894-00	CERAMIC 0.1 50V
C14	1-161-894-00	CERAMIC 0.1 50V
C15	1-161-894-00	CERAMIC 0.1 50V
C16	1-161-894-00	CERAMIC 0.1 50V
C17	1-161-894-00	CERAMIC 0.1 50V
C19	1-161-894-00	CERAMIC 0.1 50V
C22	1-161-894-00	CERAMIC 0.1 50V
C25	1-161-894-00	CERAMIC 0.1 50V
C26	1-161-894-00	CERAMIC 0.1 50V
C27	1-161-894-00	CERAMIC 0.1 50V
C28	1-161-894-00	CERAMIC 0.1 50V
C29	1-161-894-00	CERAMIC 0.1 50V
C30	1-161-894-00	CERAMIC 0.1 50V
C31	1-161-894-00	CERAMIC 0.1 50V
C32	1-161-894-00	CERAMIC 0.1 50V
C33	1-161-894-00	CERAMIC 0.1 50V
C34	1-161-894-00	CERAMIC 0.1 50V
C35	1-161-894-00	CERAMIC 0.1 50V
C36	1-161-894-00	CERAMIC 0.1 50V
C37	1-161-894-00	CERAMIC 0.1 50V
C38	1-161-894-00	CERAMIC 0.1 50V
C39	1-161-894-00	CERAMIC 0.1 50V
CN1	1-564-083-00	RECEPTACLE, 40P MALE
CN2	1-566-289-11	RECEPTACLE, 10P MALE
CN3	1-560-367-00	ILG POST HEADER 5P
CN4	1-566-292-11	RECEPTACLE, 10P MALE
CN5	1-566-292-11	RECEPTACLE, 10P MALE

Ref.No.	Part No.	Description
D1	8-719-812-31	TLR123
D2	8-719-815-55	1S1555
D3	8-719-815-55	1S1555
IC1	8-759-926-32	AM26LS32PC: ADVANCED MICRO DEVICES
IC2	8-759-915-33	SN75154N-R: TI
IC3	8-759-926-31	AM26LS31PC: ADVANCED MICRO DEVICES
IC4	8-759-951-50	SN75150P: TI
IC5	8-759-202-55	TC74HC244P: TOSHIBA
IC6	8-759-202-56	TC74HC245P: TOSHIBA
IC7	8-759-202-55	TC74HC244P: TOSHIBA
IC8	8-759-917-43	SN74HC138N: TI
IC9	8-759-202-21	TC74HC32P: TOSHIBA
IC10	8-759-202-11	TC74HC00P: TOSHIBA
IC11	8-759-922-95	MSM82C51ARS: OKI
IC12	8-759-202-14	TC74HC08P: TOSHIBA
IC13	8-759-917-43	SN74HC138N: TI
IC14	8-759-202-21	TC74HC32P: TOSHIBA
IC15	8-759-202-12	TC74HC02P: TOSHIBA
IC16	8-759-202-32	TC74HC163P: TOSHIBA
IC17	8-759-203-68	TC74HC4040P: TOSHIBA
IC18	8-759-202-33	TC74HC240P: TOSHIBA
IC20	8-759-900-68	SN74ALS30AN: TI
IC21	8-759-202-21	TC74HC32P: TOSHIBA
IC22	8-759-202-74	TC74HC04P: TOSHIBA
IC23	8-759-202-17	TC74HC14P: TOSHIBA
IC24	8-759-913-41	S-8054ALB: DAINI SEIKO
IC25	8-759-202-74	TC74HC04P: TOSHIBA
IC26	8-759-000-99	MC74HC74N: MOTOROLA
IC27	8-759-900-69	SN74ALS74N: TI
IC28	8-759-946-64	SN74ALS04BN: TI
IC29	8-759-917-43	SN74HC138N: TI
IC30	8-759-202-56	TC74HC245P: TOSHIBA
IC31	8-759-203-35	TC74HC373P: TOSHIBA
IC32	8-759-939-37	MSM80C851A-2RS: OKI
IC33	8-759-202-21	TC74HC32P: TOSHIBA
IC34	8-759-300-63	HM6264LP-15: HITACHI
IC35	8-759-300-63	HM6264LP-15: HITACHI
IC36	8-759-300-63	HM6264LP-15: HITACHI

Ref.No.	Part No.	Description
IC37	8-759-300-63	HM6264LP-15: HITACHI
IC38	8-759-778-34	27C64-SYD100011
IC39	8-759-778-33	27C64-SYC100011
IC40	8-759-778-32	27C64-SYB100011
IC41	8-759-778-31	27C64-SYA100011
IC42	8-759-112-63	uPD4701AC: NEC
IC43	8-759-202-17	TC74HC14P: TOSHIBA
Q1	8-729-281-52	2SC1815-Y
Q2	8-729-201-52	2SA1015
RB1	1-231-410-00	10K
RB2	1-231-410-00	10K
RB3	1-231-533-00	10KX4
RB4	1-231-410-00	10K
RB5	1-231-410-00	10K
RB6	1-231-408-00	5100
S1	1-516-925-21	DIP
S3	1-516-923-21	DIP
S4	1-553-943-31	DIP
S5	1-516-925-21	DIP
X1	1-527-431-00	9830.4KHZ
X2	1-527-848-00	8MHZ

Ref.No.	Part No.	Description
TG-25 BOARD		
	A-7513-469-A	MOUNTED CIRCUIT BOARD "TG-25"
C1	1-161-894-00	CERAMIC 0.1 50V
C4	1-161-894-00	CERAMIC 0.1 50V
C5	1-161-894-00	CERAMIC 0.1 50V
C6	1-161-894-00	CERAMIC 0.1 50V
C8	1-161-894-00	CERAMIC 0.1 50V
C9	1-161-894-00	CERAMIC 0.1 50V
C10	1-161-894-00	CERAMIC 0.1 50V
C12	1-102-111-00	CERAMIC 270P 10% 50V
C21	1-161-894-00	CERAMIC 0.1 50V
C22	1-161-894-00	CERAMIC 0.1 50V
C23	1-161-894-00	CERAMIC 0.1 50V
C24	1-161-894-00	CERAMIC 0.1 50V
C26	1-161-894-00	CERAMIC 0.1 50V
C28	1-161-894-00	CERAMIC 0.1 50V
C30	1-161-894-00	CERAMIC 0.1 50V
C31	1-161-894-00	CERAMIC 0.1 50V
C32	1-161-894-00	CERAMIC 0.1 50V
C39	1-161-894-00	CERAMIC 0.1 50V
C40	1-161-894-00	CERAMIC 0.1 50V
C41	1-161-894-00	CERAMIC 0.1 50V
C42	1-161-894-00	CERAMIC 0.1 50V
C44	1-161-894-00	CERAMIC 0.1 50V
C49	1-161-894-00	CERAMIC 0.1 50V
C50	1-161-894-00	CERAMIC 0.1 50V
C52	1-161-894-00	CERAMIC 0.1 50V
C53	1-161-894-00	CERAMIC 0.1 50V
C54	1-161-894-00	CERAMIC 0.1 50V
C56	1-161-894-00	CERAMIC 0.1 50V
C57	1-161-894-00	CERAMIC 0.1 50V
C58	1-161-894-00	CERAMIC 0.1 50V
C59	1-161-894-00	CERAMIC 0.1 50V
C60	1-161-894-00	CERAMIC 0.1 50V
C62	1-161-894-00	CERAMIC 0.1 50V
C63	1-161-894-00	CERAMIC 0.1 50V
C64	1-161-894-00	CERAMIC 0.1 50V
C67	1-161-894-00	CERAMIC 0.1 50V
C69	1-161-894-00	CERAMIC 0.1 50V
C71	1-161-890-00	CERAMIC 0.022 50V
C73	1-161-894-00	CERAMIC 0.1 50V
C74	1-161-894-00	CERAMIC 0.1 50V
C75	1-161-894-00	CERAMIC 0.1 50V
C77	1-161-894-00	CERAMIC 0.1 50V
C78	1-161-894-00	CERAMIC 0.1 50V
C79	1-161-894-00	CERAMIC 0.1 50V
C93	1-161-894-00	CERAMIC 0.1 50V
C94	1-161-894-00	CERAMIC 0.1 50V
C95	1-161-894-00	CERAMIC 0.1 50V
C96	1-161-894-00	CERAMIC 0.1 50V
C97	1-161-894-00	CERAMIC 0.1 50V
C98	1-161-894-00	CERAMIC 0.1 50V
C99	1-161-894-00	CERAMIC 0.1 50V
C100	1-161-894-00	CERAMIC 0.1 50V
C102	1-161-894-00	CERAMIC 0.1 50V
C104	1-161-894-00	CERAMIC 0.1 50V
C121	1-161-894-00	CERAMIC 0.1 50V
C122	1-161-894-00	CERAMIC 0.1 50V
C123	1-161-894-00	CERAMIC 0.1 50V
C126	1-161-894-00	CERAMIC 0.1 50V
C127	1-161-894-00	CERAMIC 0.1 50V
C134	1-163-239-11	CERAMIC 33P 5% 50V
CN1	1-563-721-11	RECEPTACLE, RF
CN2	1-563-721-11	RECEPTACLE, RF
CN3	1-563-721-11	RECEPTACLE, RF
CN4	1-563-721-11	RECEPTACLE, RF
CN5	1-563-721-11	RECEPTACLE, RF
D1	8-719-100-27	RD4.7EB2
D2	8-719-100-30	RD5.1EB2
D3	8-719-100-30	RD5.1EB2
D6	8-719-100-30	RD5.1EB2
D7	8-719-911-19	1SS119
D8	8-719-911-19	1SS119
D9	8-719-911-19	1SS119
D10	8-719-911-19	1SS119
D11	8-719-911-19	1SS119
D12	8-719-911-19	1SS119
D13	8-719-911-19	1SS119
D14	8-719-911-19	1SS119
D15	8-719-911-19	1SS119
D16	8-719-911-19	1SS119

Ref.No.	Part No.	Description
D17	8-719-911-19	1SS119
D18	8-719-911-19	1SS119
D19	8-719-911-19	1SS119
D20	8-719-911-19	1SS119
D21	8-719-911-19	1SS119
D22	8-719-911-19	1SS119
D23	8-719-911-19	1SS119
D24	8-719-911-19	1SS119
D25	8-719-911-19	1SS119
D26	8-719-911-19	1SS119
D27	8-719-911-19	1SS119
D28	8-719-911-19	1SS119
D30	8-719-911-19	1SS119
D31	8-719-911-19	1SS119
D32	8-719-911-19	1SS119
D33	8-719-911-19	1SS119
D34	8-719-908-10	QSCH-1754
DL2	1-415-184-31	50nS
DL2	1-415-184-31	50nS
DL2	1-415-184-31	50nS
FB1	1-535-178-00	FERRITE BEADRING
FB2	1-535-178-00	FERRITE BEADRING
FB3	1-535-178-00	FERRITE BEADRING
FB4	1-535-178-00	FERRITE BEADRING
FL1	1-235-950-11	LOW PASS 12MHz
FL2	1-235-950-11	LOW PASS 12MHz
FL3	1-235-950-11	LOW PASS 12MHz
IC1	8-759-939-56	MS1002-3: PLESSY
IC2	8-759-939-56	MS1002-3: PLESSY
IC4	8-759-910-04	SN74S04N: TI
IC5	8-759-902-21	SN74LS221N: TI
IC6	8-759-905-27	NE527H: SIGNETICS
IC7	8-759-918-71	CX23065: SONY
IC8	8-759-905-27	NE527H: SIGNETICS
IC9	8-759-923-77	HI1-5043-5: HARRIS
IC10	8-759-923-77	HI1-5043-5: HARRIS
IC11	8-759-990-84	TL084CN: TI

Ref.No.	Part No.	Description
IC12	8-759-990-84	TL084CN: TI
IC13	8-759-990-84	TL084CN: TI
IC14	8-759-203-01	TC74HC175P: TOSHIBA
IC15	8-759-203-61	TC74HC688P: TOSHIBA
IC16	8-759-901-23	SN74LS123N: TI
Q1	8-729-266-83	2SC2668
Q2	8-729-266-83	2SC2668
Q3	8-729-103-19	2SA1206-K1
Q4	8-729-266-83	2SC2668
Q5	8-729-266-83	2SC2668
Q6	8-729-110-53	2SA1005
Q7	8-729-266-83	2SC2668
Q8	8-729-266-83	2SC2668
Q9	8-729-266-83	2SC2668
Q10	8-729-103-19	2SA1206-K1
Q11	8-729-178-62	2SC2786-L
Q12	8-729-178-62	2SC2786-L
Q13	8-729-178-62	2SC2786-L
Q14	8-729-110-53	2SA1005
Q15	8-729-178-62	2SC2786-L
Q16	8-729-110-53	2SA1005
Q17	8-729-190-12	2SC2901
Q18	8-729-103-19	2SA1206-K1
Q19	8-729-190-12	2SC2901
Q20	8-729-103-19	2SA1206-K1
Q21	8-729-190-12	2SC2901
Q22	8-729-103-19	2SA1206-K1
Q23	8-729-190-12	2SC2901
Q24	8-729-103-19	2SA1206-K1
Q25	8-729-110-53	2SA1005
Q26	8-729-266-83	2SC2668
Q27	8-729-266-83	2SC2668
Q28	8-729-266-83	2SC2668
Q29	8-729-266-83	2SC2668
Q30	8-729-266-83	2SC2668
Q31	8-729-266-83	2SC2668
Q32	8-729-266-83	2SC2668
Q33	8-729-266-83	2SC2668
Q34	8-729-266-83	2SC2668
Q35	8-729-266-83	2SC2668

Ref.No.	Part No.	Description
Q36	8-729-266-83	2SC2668
Q37	8-729-266-83	2SC2668
Q38	8-729-110-53	2SA1005
Q39	8-729-266-83	2SC2668
Q40	8-729-266-83	2SC2668
Q41	8-729-266-83	2SC2668
Q42	8-729-110-53	2SA1005
Q43	8-729-266-83	2SC2668
Q44	8-729-266-83	2SC2668
Q45	8-729-266-83	2SC2668
Q46	8-729-266-83	2SC2668
Q47	8-729-266-83	2SC2668
Q48	8-729-266-83	2SC2668
Q49	8-729-266-83	2SC2668
Q50	8-729-266-83	2SC2668
Q51	8-729-266-83	2SC2668
Q52	8-729-266-83	2SC2668
Q53	8-729-103-19	2SA1206-K1
Q54	8-729-103-19	2SA1206-K1
Q55	8-729-103-19	2SA1206-K1
Q56	8-729-103-19	2SA1206-K1
Q57	8-729-103-19	2SA1206-K1
Q58	8-729-266-83	2SC2668
Q59	8-729-110-53	2SA1005
Q60	8-729-266-83	2SC2668
Q61	8-729-103-19	2SA1206-K1
Q62	8-729-103-19	2SA1206-K1
Q63	8-729-266-83	2SC2668
Q64	8-729-266-83	2SC2668
Q65	8-729-266-83	2SC2668
Q66	8-729-266-83	2SC2668
Q67	8-729-103-19	2SA1206-K1
Q68	8-729-103-19	2SA1206-K1
Q69	8-729-103-19	2SA1206-K1
Q70	8-729-103-19	2SA1206-K1
Q71	8-729-103-19	2SA1206-K1
Q72	8-729-103-19	2SA1206-K1
Q73	8-729-103-19	2SA1206-K1
Q74	8-729-103-19	2SA1206-K1
Q75	8-729-103-19	2SA1206-K1
Q76	8-729-103-19	2SA1206-K1
Q77	8-729-103-19	2SA1206-K1
Q78	8-729-103-19	2SA1206-K1
Q79	8-729-103-19	2SA1206-K1
Q80	8-729-103-19	2SA1206-K1

Ref.No.	Part No.	Description
Q81	8-729-103-19	2SA1206-K1
Q82	8-729-103-19	2SA1206-K1
Q83	8-729-103-19	2SA1206-K1
Q84	8-729-103-19	2SA1206-K1
Q85	8-729-266-83	2SC2668
Q86	8-729-266-83	2SC2668
Q87	8-729-266-83	2SC2668
Q88	8-729-266-83	2SC2668
Q89	8-729-266-83	2SC2668
Q90	8-729-266-83	2SC2668
Q91	8-729-266-83	2SC2668
Q92	8-729-266-83	2SC2668
Q93	8-729-266-83	2SC2668
Q100	8-729-266-83	2SC2668
Q101	8-729-266-83	2SC2668
Q102	8-729-266-83	2SC2668
Q103	8-729-266-83	2SC2668
Q104	8-729-266-83	2SC2668
Q105	8-729-266-83	2SC2668
Q106	8-729-266-83	2SC2668
Q107	8-729-266-83	2SC2668
Q108	8-729-266-83	2SC2668
Q109	8-729-266-83	2SC2668
Q110	8-729-266-83	2SC2668
Q111	8-729-266-83	2SC2668
Q112	8-729-266-83	2SC2668
Q113	8-729-178-54	2SC2785
Q114	8-729-178-54	2SC2785
Q115	8-729-178-54	2SC2785
Q116	8-729-266-83	2SC2668
Q117	8-729-266-83	2SC2668
Q118	8-729-266-83	2SC2668
Q119	8-729-103-19	2SA1206-K1
Q120	8-729-117-54	2SA1175
Q121	8-729-266-83	2SC2668
Q122	8-729-103-19	2SA1206-K1
Q123	8-729-266-83	2SC2668
Q130	8-729-190-12	2SC2901
Q131	8-729-266-83	2SC2668
Q132	8-729-103-19	2SA1206-K1
Q133	8-729-103-19	2SA1206-K1
Q134	8-729-103-19	2SA1206-K1
Q135	8-729-103-19	2SA1206-K1
Q136	8-729-103-19	2SA1206-K1
Q137	8-729-103-19	2SA1206-K1

Ref.No.	Part No.	Description
Q138	8-729-178-54	2SC2785
Q139	8-729-178-54	2SC2785
Q140	8-729-178-54	2SC2785
Q141	8-729-178-54	2SC2785
Q142	8-729-178-54	2SC2785
Q143	8-729-178-54	2SC2785
Q144	8-729-110-53	2SA1005
Q145	8-729-110-53	2SA1005
Q146	8-729-110-53	2SA1005
Q147	8-729-110-53	2SA1005
Q148	8-729-110-53	2SA1005
Q149	8-729-110-53	2SA1005
Q150	8-729-190-12	2SC2901
Q151	8-729-190-12	2SC2901
Q152	8-729-190-12	2SC2901
R108	1-215-439-00	METAL 5600 1% 1/6W
R111	1-215-390-00	METAL 51 1% 1/6W
R113	1-215-390-00	METAL 51 1% 1/6W
R196	1-216-752-11	METAL FOIL 1.667K
R197	1-215-957-11	METAL FOIL 1.000K
R198	1-216-755-11	METAL FOIL 13.67K
R199	1-216-749-11	METAL FOIL 847.5
R200	1-216-750-11	METAL FOIL 1.079K
R201	1-216-751-11	METAL FOIL 1.340K
R202	1-216-754-11	METAL FOIL 4.545K
R203	1-216-753-11	METAL FOIL 3.937K
R204	1-215-957-11	METAL FOIL 1.000K
R205	1-216-752-11	METAL FOIL 1.667K
R206	1-215-957-11	METAL FOIL 1.000K
R207	1-216-755-11	METAL FOIL 13.67K
R208	1-216-749-11	METAL FOIL 847.5
R209	1-216-750-11	METAL FOIL 1.079K
R210	1-216-751-11	METAL FOIL 1.340K
R211	1-216-754-11	METAL FOIL 4.545K
R212	1-216-753-11	METAL FOIL 3.937K
R213	1-215-957-11	METAL FOIL 1.000K
R325	1-216-752-11	METAL FOIL 1.667K
R326	1-216-749-11	METAL FOIL 847.5
R327	1-216-754-11	METAL FOIL 4.545K
R329	1-215-957-11	METAL FOIL 1.000K

Ref.No.	Part No.	Description
R330	1-216-751-11	METAL FOIL 1.340K
R331	1-216-753-11	METAL FOIL 3.937K
R333	1-215-957-11	METAL FOIL 1.000K
R334	1-216-750-11	METAL FOIL 1.079K
R335	1-216-755-11	METAL FOIL 13.67K
R342	1-216-025-11	CHIP 100 5% 1/10W
R343	1-216-025-11	CHIP 100 5% 1/10W
R344	1-216-025-11	CHIP 100 5% 1/10W
R345	1-216-025-11	CHIP 100 5% 1/10W
R346	1-216-025-11	CHIP 100 5% 1/10W
R347	1-216-025-11	CHIP 100 5% 1/10W
R348	1-216-025-11	CHIP 100 5% 1/10W
R349	1-216-025-11	CHIP 100 5% 1/10W
R350	1-216-025-11	CHIP 100 5% 1/10W
R351	1-216-025-11	CHIP 100 5% 1/10W
R352	1-216-025-11	CHIP 100 5% 1/10W
R353	1-216-025-11	CHIP 100 5% 1/10W
R354	1-216-025-11	CHIP 100 5% 1/10W
RV1	1-228-457-00	METAL 2K
RV2	1-228-460-00	METAL 20K
RV3	1-228-456-00	METAL 1K
RV4	1-228-462-00	METAL 100K
RV5	1-228-456-00	METAL 1K
RV6	1-228-456-00	METAL 1K
RV7	1-228-456-00	METAL 1K
RV8	1-228-456-00	METAL 1K
RV9	1-228-455-00	METAL 500
RV10	1-228-456-00	METAL 1K
RV11	1-228-457-00	METAL 2K
RV12	1-228-458-00	METAL 5K
RV13	1-228-458-00	METAL 5K
RV14	1-228-458-00	METAL 5K
RV15	1-228-459-00	METAL 10K
RV16	1-228-459-00	METAL 10K
RV17	1-228-459-00	METAL 10K
RV18	1-228-458-00	METAL 5K
RV19	1-228-458-00	METAL 5K
RV20	1-228-458-00	METAL 5K
RV21	1-228-462-00	METAL 100K
RV22	1-228-456-00	METAL 1K
RV23	1-228-458-00	METAL 5K
RV24	1-228-458-00	METAL 5K
RV25	1-228-455-00	METAL 500
RV26	1-228-455-00	METAL 500
RV27	1-228-455-00	METAL 500
RV28	1-228-457-00	METAL 2K
X1	1-567-785-11	28.7600MHZ

Ref.No.	Part No.	Description
WP-18 BOARD		
	A-7513-473-A	MOUNTED CIRCUIT BOARD "WP-18"
C1	1-161-894-00	CERAMIC 0.1 50V
C5	1-163-038-00	CERAMIC CHIP 0.1 25V
C7	1-161-894-00	CERAMIC 0.1 50V
C8	1-161-894-00	CERAMIC 0.1 50V
C9	1-161-894-00	CERAMIC 0.1 50V
C12	1-163-038-00	CERAMIC CHIP 0.1 25V
C15	1-161-894-00	CERAMIC 0.1 50V
C20	1-161-894-00	CERAMIC 0.1 50V
C21	1-161-894-00	CERAMIC 0.1 50V
C30	1-161-894-00	CERAMIC 0.1 50V
C31	1-161-039-00	CERAMIC 0.001 10% 25V
C33	1-161-894-00	CERAMIC 0.1 50V
C36	1-161-894-00	CERAMIC 0.1 50V
C37	1-161-039-00	CERAMIC 0.001 10% 25V
C44	1-161-894-00	CERAMIC 0.1 50V
C46	1-161-894-00	CERAMIC 0.1 50V
C48	1-161-894-00	CERAMIC 0.1 50V
C50	1-161-894-00	CERAMIC 0.1 50V
C51	1-163-038-00	CERAMIC CHIP 0.1 25V
C53	1-161-894-00	CERAMIC 0.1 50V
C55	1-161-894-00	CERAMIC 0.1 50V
C56	1-161-894-00	CERAMIC 0.1 50V
C57	1-161-894-00	CERAMIC 0.1 50V
C58	1-161-894-00	CERAMIC 0.1 50V
C61	1-161-894-00	CERAMIC 0.1 50V
C63	1-131-347-00	TANTALUM 1 10% 35V
C68	1-161-888-21	CERAMIC 0.01 50V
C71	1-161-894-00	CERAMIC 0.1 50V
C72	1-161-894-00	CERAMIC 0.1 50V
C74	1-161-894-00	CERAMIC 0.1 50V
C75	1-161-894-00	CERAMIC 0.1 50V
C76	1-161-894-00	CERAMIC 0.1 50V
C79	1-161-894-00	CERAMIC 0.1 50V
C80	1-161-894-00	CERAMIC 0.1 50V
C81	1-163-038-00	CERAMIC CHIP 0.1 25V
C82	1-163-038-00	CERAMIC CHIP 0.1 25V
C89	1-102-110-00	CERAMIC 220P 10% 50V
C90	1-162-781-31	CERAMIC 0.022 5% 50V
C91	1-161-894-00	CERAMIC 0.1 50V
C92	1-161-894-00	CERAMIC 0.1 50V

Ref.No.	Part No.	Description
C93	1-131-384-00	TANTALUM 15 10% 6.3V
C98	1-161-894-00	CERAMIC 0.1 50V
C101	1-161-894-00	CERAMIC 0.1 50V
C104	1-161-894-00	CERAMIC 0.1 50V
C105	1-161-894-00	CERAMIC 0.1 50V
C106	1-161-894-00	CERAMIC 0.1 50V
C107	1-161-894-00	CERAMIC 0.1 50V
C108	1-161-894-00	CERAMIC 0.1 50V
C112	1-161-894-00	CERAMIC 0.1 50V
C113	1-161-894-00	CERAMIC 0.1 50V
C114	1-161-894-00	CERAMIC 0.1 50V
C115	1-161-894-00	CERAMIC 0.1 50V
C119	1-161-894-00	CERAMIC 0.1 50V
C121	1-161-894-00	CERAMIC 0.1 50V
C125	1-161-894-00	CERAMIC 0.1 50V
C201	1-161-894-00	CERAMIC 0.1 50V
C202	1-161-894-00	CERAMIC 0.1 50V
C203	1-161-888-21	CERAMIC 0.01 50V
C204	1-131-347-00	TANTALUM 1 10% 35V
C206	1-161-888-21	CERAMIC 0.01 50V
C208	1-131-368-00	TANTALUM 3.3 10% 16V
C209	1-131-368-00	TANTALUM
C212	1-131-368-00	TANTALUM 3.3 10% 16V
C214	1-161-887-21	CERAMIC 0.0068 50V
C215	1-161-887-21	CERAMIC 0.0068 50V
C216	1-161-887-21	CERAMIC 0.0068 50V
C217	1-161-887-21	CERAMIC 0.0068 50V
C218	1-161-887-21	CERAMIC 0.0068 50V
C219	1-161-887-21	CERAMIC 0.0068 50V
C224	1-161-887-11	CERAMIC 0.0068 50V
C227	1-161-894-00	CERAMIC 0.1 50V
C229	1-161-888-21	CERAMIC 0.01 50V
C235	1-124-555-00	ELECT 1000 20% 16V
C237	1-131-384-00	TANTALUM 15 10% 6.3V
C238	1-162-781-31	CERAMIC 0.022 5% 50V
C240	1-161-894-00	CERAMIC 0.1 50V
C241	1-161-888-21	CERAMIC 0.01 50V
C242	1-161-887-21	CERAMIC 0.0068 50V
C246	1-161-894-00	CERAMIC 0.1 50V
C247	1-163-038-00	CERAMIC CHIP 0.1 25V
C249	1-163-111-00	CERAMIC CHIP 56PF 5% 50V
C250	1-163-125-00	CERAMIC CHIP 220PF 5% 50V
C251	1-161-894-11	CERAMIC 0.1 50V
CN1	1-563-721-11	RECEPTACLE, RF

Ref.No.	Part No.	Description
CV1	1-141-260-00	TRIMAR
D1	8-719-911-19	1SS119
D2	8-719-911-19	1SS119
D3	8-719-911-19	1SS119
D4	8-719-911-19	1SS119
D5	8-719-911-19	1SS119
D6	8-719-908-10	QSCH-1754
D7	8-719-908-10	QSCH-1754
D8	8-719-908-10	QSCH-1754
D9	8-719-908-10	QSCH-1754
D10	8-719-908-10	QSCH-1754
D11	8-719-908-10	QSCH-1754
D12	8-719-908-10	QSCH-1754
D13	8-719-911-19	1SS119
D14	8-719-911-19	1SS119
D15	8-719-911-19	1SS119
D16	8-719-911-19	1SS119
D17	8-719-911-19	1SS119
D18	8-719-911-19	1SS119
D19	8-719-911-19	1SS119
D20	8-719-911-19	1SS119
D21	8-719-911-19	1SS119
D22	8-719-908-10	QSCH-1754
D23	8-719-908-10	QSCH-1754
D24	8-719-911-19	1SS119
D25	8-719-911-19	1SS119
D26	8-719-911-19	1SS119
D27	8-719-911-19	1SS119
D32	8-719-911-19	1SS119
D33	8-719-911-19	1SS119
D34	8-719-908-10	QSCH-1754
D35	8-719-908-10	QSCH-1754
D101	8-719-911-19	1SS119
D102	8-719-903-27	1SS168
D103	8-719-903-27	1SS168
D104	8-719-911-19	1SS119
D105	8-719-903-27	1SS168
D106	8-719-903-27	1SS168
D107	8-719-903-27	1SS168
D108	8-719-903-27	1SS168
D109	8-719-903-27	1SS168

Ref.No.	Part No.	Description
D110	8-719-903-27	1SS168
D111	8-719-903-27	1SS168
D112	8-719-903-27	1SS168
D113	8-719-903-27	1SS168
D114	8-719-903-27	1SS168
D115	8-719-903-27	1SS168
D116	8-719-911-19	1SS119
D117	8-719-911-19	1SS119
D118	8-719-903-27	1SS168
D119	8-719-903-27	1SS168
D122	8-719-908-10	QSCH-1754
D123	8-719-903-27	1SS168
D124	8-719-903-27	1SS168
D125	8-719-911-19	1SS119
D126	8-719-911-19	1SS119
DL1	1-415-168-00	200nS
IC1	8-759-900-59	HI1-0201-5: HARRIS
IC2	8-759-908-86	HI1-201HS-5: HARRIS
IC3	8-759-900-59	HI1-0201-5: HARRIS
IC4	8-759-908-86	HI1-201HS-5: HARRIS
IC5	8-759-918-92	HA3-2525-5: HARRIS
IC6	8-759-923-77	HI1-5043-5: HARRIS
IC7	8-759-918-92	HA3-2525-5: HARRIS
IC8	8-759-918-92	HA3-2525-5: HARRIS
IC9	8-759-900-59	HI1-0201-5: HARRIS
IC10	8-759-923-77	HI1-5043-5: HARRIS
IC11	8-759-205-32	TC74HC374F: TOSHIBA
IC12	8-759-205-32	TC74HC374F: TOSHIBA
IC13	8-759-205-32	TC74HC374F: TOSHIBA
IC14	8-759-205-17	TC74HC174F: TOSHIBA
IC15	8-759-645-17	M54517P: MITSUBISHI
IC16	8-759-700-08	NJM4558S: JRC
IC17	8-759-205-23	TC74HC244F: TOSHIBA
IC18	8-759-205-09	TC74HC138F: TOSHIBA
IC20	8-759-900-59	HI1-0201-5: HARRIS
IC21	8-759-700-08	NJM4558S: JRC
IC22	8-759-918-92	HA3-2525-5: HARRIS
IC23	8-759-923-77	HI1-5043-5: HARRIS
IC24	8-759-908-86	HI1-201HS-5: HARRIS
IC25	8-759-205-32	TC74HC374F: TOSHIBA
IC26	8-759-205-32	TC74HC374F: TOSHIBA

Ref.No.	Part No.	Description
IC27	8-759-205-17	TC74HC174F: TOSHIBA
IC28	8-759-900-59	HI1-0201-5: HARRIS
IC29	8-759-900-59	HI1-0201-5: HARRIS
IC30	8-759-908-86	HI1-201HS-5: HARRIS
IC31	8-759-908-86	HI1-201HS-5: HARRIS
IC32	8-759-204-96	TC74HC04F: TOSHIBA
IC33	8-759-205-11	TC74HC153F: TOSHIBA
IC34	8-759-205-11	TC74HC153F: TOSHIBA
IC35	8-759-205-12	TC74HC157F: TOSHIBA
IC36	8-759-205-09	TC74HC138F: TOSHIBA
IC37	8-759-205-09	TC74HC138F: TOSHIBA
IC38	8-759-205-09	TC74HC138F: TOSHIBA
IC39	8-759-918-92	HA3-2525-5: HARRIS
IC40	8-759-700-08	NJM4558S: JRC
IC41	8-759-205-32	TC74HC374F: TOSHIBA
IC42	8-759-205-32	TC74HC374F: TOSHIBA
IC44	8-759-205-17	TC74HC174F: TOSHIBA
IC45	8-759-900-59	HI1-0201-5: HARRIS
IC46	8-759-908-86	HI1-201HS-5: HARRIS
IC49	8-759-980-38	ICL8038BCJD: INTERSIL
IC50	8-759-700-08	NJM4558S: JRC
IC51	8-759-202-86	TC74HC123P: TOSHIBA
IC52	8-759-900-59	HI1-0201-5: HARRIS
IC53	8-759-205-17	TC74HC174F: TOSHIBA
IC54	8-759-205-32	TC74HC374F: TOSHIBA
IC55	8-759-205-17	TC74HC174F: TOSHIBA
IC56	8-759-900-59	HI1-0201-5: HARRIS
IC57	8-759-908-86	HI1-201HS-5: HARRIS
IC58	8-759-900-59	HI1-0201-5: HARRIS
IC59	8-759-918-92	HA3-2525-5: HARRIS
IC60	8-759-918-92	HA3-2525-5: HARRIS
IC61	8-759-923-77	HI1-5043-5: HARRIS
IC62	8-759-908-86	HI1-201HS-5: HARRIS
IC63	8-759-908-86	HI1-201HS-5: HARRIS
IC64	8-759-205-06	TC74HC74F: TOSHIBA
IC65	8-759-205-06	TC74HC74F: TOSHIBA
IC68	8-759-900-59	HI1-0201-5: HARRIS
IC69	8-759-918-92	HA3-2525-5: HARRIS
IC70	8-759-918-92	HA3-2525-5: HARRIS
IC71	8-759-918-92	HA3-2525-5: HARRIS
IC72	8-759-918-92	HA3-2525-5: HARRIS
IC73	8-759-939-40	LM3046N: NSC
IC74	8-759-700-08	NJM4558S: JRC
IC75	8-759-700-08	NJM4558S: JRC
IC76	8-759-700-08	NJM4558S: JRC

Ref.No.	Part No.	Description
IC77	8-759-918-92	HA3-2525-5: HARRIS
IC78	8-759-700-65	NJM79L05A: JRC
IC79	8-759-708-05	NJM78L05A: JRC
IC80	8-759-914-01	AD7524JN: ANALOG DEVICES
IC81	8-759-918-92	HA3-2525-5: HARRIS
IC101	8-759-930-80	CA3080E: RCA
IC102	8-759-930-80	CA3080E: RCA
IC103	8-759-708-05	NJM78L05A: JRC
Q1	8-729-117-54	2SA1175
Q2	8-729-266-83	2SC2668
Q3	8-729-103-19	2SA1206-K1
Q4	8-729-117-54	2SA1175
Q5	8-729-103-19	2SA1206-K1
Q6	8-729-103-19	2SA1206-K1
Q7	8-729-117-54	2SA1175
Q8	8-729-103-19	2SA1206-K1
Q9	8-729-117-54	2SA1175
Q10	8-729-178-54	2SC2785
Q11	8-729-117-54	2SA1175
Q12	8-729-117-54	2SA1175
Q13	8-729-178-54	2SC2785
Q14	8-729-178-54	2SC2785
Q15	8-729-266-83	2SC2668
Q16	8-729-266-83	2SC2668
Q17	8-729-266-83	2SC2668
Q18	8-729-178-54	2SC2785
Q19	8-729-117-54	2SA1175
Q20	8-729-117-54	2SA1175
Q21	8-729-103-19	2SA1206-K1
Q22	8-729-103-19	2SA1206-K1
Q23	8-729-178-54	2SC2785
Q24	8-729-117-54	2SA1175
Q25	8-729-266-83	2SC2668
Q26	8-729-117-54	2SA1175
Q27	8-729-266-83	2SC2668
Q28	8-729-266-83	2SC2668
Q30	8-729-117-54	2SA1175
Q31	8-729-178-54	2SC2785
Q32	8-729-266-83	2SC2668
Q33	8-729-178-54	2SC2785
Q34	8-729-266-83	2SC2668
Q35	8-729-266-83	2SC2668
Q36	8-729-266-83	2SC2668

Ref.No.	Part No.	Description
Q37	8-729-117-54	2SA1175
Q38	8-729-103-19	2SA1206-K1
Q39	8-729-117-54	2SA1175
Q40	8-729-266-83	2SC2668
Q41	8-729-266-83	2SC2668
Q42	8-729-266-83	2SC2668
Q43	8-729-103-19	2SA1206-K1
Q44	8-729-178-54	2SC2785
Q45	8-729-117-54	2SA1175
Q46	8-729-117-54	2SA1175
Q47	8-729-117-54	2SA1175
Q48	8-729-117-54	2SA1175
Q49	8-729-117-54	2SA1175
Q50	8-729-178-54	2SC2785
Q51	8-729-117-54	2SA1175
Q52	8-729-266-83	2SC2668-Y
Q53	8-729-117-54	2SA1175
Q54	8-729-266-83	2SC2668
Q55	8-729-178-54	2SC2785
Q56	8-729-178-54	2SC2785
Q57	8-729-117-54	2SA1175
Q58	8-729-117-54	2SA1175
Q59	8-729-178-54	2SC2785
Q60	8-729-178-54	2SC2785
Q62	8-729-266-83	2SC2668
Q63	8-729-117-54	2SA1175
Q64	8-729-266-83	2SC2668
Q66	8-729-103-19	2SA1206-K1
Q67	8-729-103-19	2SA1206-K1
Q68	8-729-266-83	2SC2668
Q69	8-729-266-83	2SC2668
Q70	8-729-178-54	2SC2785
Q71	8-729-117-54	2SA1175
Q72	8-729-103-19	2SA1206-K1
Q73	8-729-103-19	2SA1206-K1
Q74	8-729-103-19	2SA1206-K1
Q75	8-729-103-19	2SA1206-K1
Q76	8-729-103-19	2SA1206-K1
Q77	8-729-117-54	2SA1175
Q78	8-729-117-54	2SA1175
Q79	8-729-178-54	2SC2785
Q80	8-729-103-19	2SA1206-K1
Q81	8-729-103-19	2SA1206-K1
Q82	8-729-103-19	2SA1206-K1
Q83	8-729-103-19	2SA1206-K1

Ref.No.	Part No.	Description
Q84	8-729-266-83	2SC2668
Q85	8-729-117-54	2SA1175
Q86	8-729-117-54	2SA1175
Q87	8-729-266-83	2SC2668
Q88	8-729-266-83	2SC2668
Q89	8-729-178-54	2SC2785
Q90	8-729-266-83	2SC2668
Q91	8-729-117-54	2SA1175
Q92	8-729-266-83	2SC2668
Q93	8-729-266-83	2SC2668
Q94	8-729-117-54	2SA1175
Q95	8-729-117-54	2SA1175
Q96	8-729-117-54	2SA1175
Q97	8-729-266-83	2SC2668
Q98	8-729-178-54	2SC2785
Q99	8-729-266-83	2SC2668
Q100	8-729-266-83	2SC2668
Q101	8-729-117-54	2SA1175
Q102	8-729-266-83	2SC2668
Q103	8-729-117-54	2SA1175
Q104	8-729-266-83	2SC2668
Q105	8-729-266-83	2SC2668
Q106	8-729-178-54	2SC2785
Q107	8-729-266-83	2SC2668
Q201	8-729-117-54	2SA1175
Q202	8-729-117-54	2SA1175
Q203	8-729-117-54	2SA1175
Q204	8-729-117-54	2SA1175
Q205	8-729-178-54	2SC2785
Q206	8-729-178-54	2SC2785
Q208	8-729-117-54	2SA1175
Q209	8-729-117-54	2SA1175
Q210	8-729-178-54	2SC2785
Q211	8-729-178-54	2SC2785
Q212	8-729-266-83	2SC2668
Q213	8-729-117-54	2SA1175
R195	1-216-085-00	METAL CHIP 33K 5% 1/10W
R222	1-216-042-00	METAL CHIP 510 5% 1/10W
R225	1-216-057-00	METAL CHIP 2.2K 5% 1/10W
R233	1-216-057-00	METAL CHIP 2.2K 5% 1/10W
R278	1-216-061-00	METAL CHIP 3.3K 5% 1/10W

Ref.No.	Part No.	Description
R301	1-216-085-00	METAL CHIP 33K 5% 1/10W
R302	1-216-041-00	METAL CHIP 470 5% 1/10W
R310	1-216-067-00	METAL CHIP 5.6K 5% 1/10W
R331	1-216-073-00	METAL CHIP 10K 5% 1/10W
R338	1-216-095-00	METAL CHIP 82K 5% 1/10W
R341	1-216-081-00	METAL CHIP 22K 5% 1/10W
R342	1-216-067-00	METAL CHIP 5.6K 5% 1/10W
R357	1-216-085-00	METAL CHIP 33K 5% 1/10W
R358	1-216-053-00	METAL CHIP 1.5K 5% 1/10W
R359	1-216-076-00	METAL CHIP 1.3K 5% 1/10W
R360	1-216-061-00	METAL CHIP 3.3K 5% 1/10W
R361	1-216-073-00	METAL CHIP 10K 5% 1/10W

Ref.No.	Part No.	Description
RB1	1-235-949-11	RESISTOR BLOCK
RB2	1-235-949-11	RESISTOR BLOCK
RB3	1-235-949-11	RESISTOR BLOCK
RB4	1-235-949-11	RESISTOR BLOCK
RB5	1-235-949-11	RESISTOR BLOCK
RB7	1-235-949-11	RESISTOR BLOCK

Ref.No.	Part No.	Description
RV1	1-228-459-00	METAL 10K
RV2	1-228-456-00	METAL 1K
RV3	1-228-456-00	METAL 1K
RV5	1-228-455-00	METAL 500
RV6	1-228-454-00	METAL 200
RV8	1-228-456-00	METAL 1K
RV9	1-228-456-00	METAL 1K
RV12	1-228-454-00	METAL 200
RV13	1-228-455-00	METAL 500
RV14	1-228-459-00	METAL 10K
RV16	1-228-461-00	METAL 50K
RV17	1-228-456-00	METAL 1K
RV18	1-228-456-00	METAL 1K
RV19	1-228-456-00	METAL 1K
RV21	1-228-456-00	METAL 1K
RV22	1-228-456-00	METAL 1K
RV23	1-228-457-00	METAL 2K
RV24	1-228-457-00	METAL 2K
RV25	1-228-457-00	METAL 2K
RV26	1-228-461-00	METAL 50K
RV28	1-228-456-00	METAL 1K
RV29	1-228-456-00	METAL 1K
RV31	1-228-459-00	METAL 10K
RV33	1-228-459-00	METAL 10K
RV34	1-228-458-00	METAL 2K

Ref.No.	Part No.	Description
RV35	1-228-458-00	METAL 5K
RV36	1-228-459-00	METAL 10K
RV37	1-228-459-00	METAL 10K
RV38	1-228-459-00	METAL 10K
RV39	1-228-459-00	METAL 10K
RV40	1-228-459-00	METAL 10K
RV41	1-228-458-00	METAL 5K
RV42	1-228-459-00	METAL 10K
RV101	1-228-456-00	METAL 1K

Ref.No.	Part No.	Description
FRAME		
⚠	1-413-271-11	SWITCHING REGULATER (ES-10-12)
⚠	1-413-272-11	SWITCHING REGULATER (ES-9-5)
	1-558-957-12	FLATE CABLE ASSY
	1-558-957-21	FLATE CABLE ASSY
	1-558-958-11	FLATE CABLE ASSY 40P
	1-558-997-11	FLATE CABLE ASSY 10P
	1-561-655-11	RECEPTACLE, 9P FEMALE "REMOTE 1 (S10)"
	1-561-897-11	RECEPTACLE, 15P FEMALE "VE"
	1-561-899-11	RECEPTACLE, 50P FEMALE
	1-562-323-11	RECEPTACLE, 25P FEMALE "TALLY OUT"
	1-563-078-11	RECEPTACLE, 15P MALE
	1-566-293-11	RECEPTACLE, 25P FEMALE "PIO"
	1-938-283-11	RE CONNECTOR CABLE WITH HARNESS
	1-560-743-11	PLUG, RF
	1-940-237-11	HARNESS (SY-1)
	1-940-237-21	HARNESS (SY-2)
	1-560-190-00	CONNECTOR 20P
⚠CB101	1-532-793-11	BREAKER
CN37	1-938-290-31	BL CABLE WITH HARNESS
	1-560-163-00	PLUG, RF
	1-563-190-11	RECEPTACLE, BNC
CN38	1-561-336-11	BNC CONNECTOR
CN39	1-561-336-11	BNC CONNECTOR
CN41	1-938-290-51	BL CABLE WITH HARNESS
	1-560-743-00	PLUG, RF
	1-563-190-11	RECEPTACLE, BNC
IC101	8-759-939-55	LT350AK: LINEAR TECHNOLOGY
IC102	8-759-939-54	LT1033CK: LINEAR TECHNOLOGY
M101	8-838-100-01	FAN
RV101	1-237-495-11	JOY STICK 5K
S101	1-570-743-21	AC POWER
⚠T101	1-448-771-13	TRANSFORMER ASSY, POWER
	1-508-681-11	SMALL CONNECTOR R HOUSING 3P FEMALE
	1-508-682-11	SMALL CONNECTOR P HOUSING 3P FEMALE
	1-535-070-11	MINIATURE MALE CONTACT
	1-535-072-11	MINIATURE FEMALE CONTACT
	1-561-829-11	SMALL CONNECTOR R HOUSING 2P FEMALE
	1-561-830-11	SMALL CONNECTOR P HOUSING 2P FEMALE
	4-601-466-11	COVER 3P INLET

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